ASSESSMENT OF ADEQUACY OF REIMBURSEMENT RATES TO PHARMACIES AND ITS IMPACT ON THE ACCESS TO MEDICATION AND PHARMACY SERVICES BY MEDICAID RECIPIENTS

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EXECUTIVE SUMMARY

Growth in Medicaid expenditures has recently become a major policy concern. Medicaid expenditures are growing faster than any other State budgetary expense. Total Medicaid expenditures for the Nation grew by 27 percent in 1991 alone (Feder et al., 1992). Projected (1993) Medicaid growth rates substantially exceed expected growth in Medicare and, if realized, would make Medicaid the fastest growing component of the Federal budget as well. Drug benefit expenditures in the average Medicaid plan rose 75 percent overall, more than doubling in 10 States from 1984 to 1988 (Pryor, 1990). From 1990 to 1991, Medicaid dollars spent on prescription drugs grew by an average of 25 percent across the country while overall expenditures grew by 27%. Yet, drug expenses as a percentage of the total Medicaid budget have risen only slowly from 5.9% in 1985 to 6.5% in 1991.[1]

Over the years, there has been Federal legislation aimed at controlling program costs for prescription drug benefits. Controls on the amounts paid for the ingredient cost of prescriptions had been in the form of upper limits, or Maximum Allowable Costs (MACs) but concerns with access led to increased flexibility for the States during the latter part of the 1980s. In 1987, under new Federal regulations (52 FR 28648), States were given more flexibility in establishing their own payment methodologies. State reimbursement policy now varies for the two major drug classifications. For the multi-source drugs, there can be State MACs in place that differ from the Federal maximums, although States' payments must stay within the Federal aggregate expenditure limits. For other drugs, States reimburse for the lower of the pharmacy's usual and customary charges or the Estimated Acquisition Cost (EAC) as estimated by the State.

Pertinent to this study, Section 4401(d)(4) of OBRA 1990 required the Secretary to conduct a "Study on reimbursement rates to Pharmacists." The specific mandates for the study were to determine:

> "(i) the adequacy of current reimbursement rates to pharmacists under each State medical assistance programs (sic) conducted under Title XIX of the Social Security Act; and

[1]Data used to calculate this growth rate were HCFA 2082 data (aggregate State data on expenditures and enrollees) which were cleaned and edited by The Urban Institute under contract to the Robert Wood Johnson Foundation.

(ii) the extent to which reimbursement rates under such programs have an effect on beneficiary access to medications covered and pharmacy services under such programs."

This report addresses research questions in these two major areas:

Adequacy

- Do average variable and/or marginal costs of pharmacies decline with volume?
- Are State payments adequate in relation to the costs of dispensing drugs; are they generally above marginal costs?
- How do State delays in payment affect adequacy of payment?
- What State characteristics relate to adequacy of payment?

Access

- How do measures of access vary across States?
- What is the relationship between the adequacy of State payment to these measures of access?
- What other factors affect access?

To answer these questions, 1991 data from several sources are used to derive key measures of payment adequacy and access. The method for measuring the adequacy of State payment involves two major steps: 1) developing estimates of average pharmacy ingredient and dispensing costs at the State level; and 2) simulating State Medicaid payments for the same set of drugs. The difference between these payment and cost measures for a representative market basket of drug products form the basis of the adequacy measure presented here. That is, adequacy is measured relative to average total costs. The results have to be considered in light of the data constraints and assumptions made in deriving estimates.

The estimation of the amounts paid by the Medicaid programs in each State were simulated by using information on each State's payment formula for ingredient costs, dispensing fee amounts, and other details that could be incorporated into the simulation. For example, adjustments were made to recognize: 1) State MACs; 2) States that use a range on dispensing fees and/or pay incentives; 3) differences in the average product size dispensed due to limits on the number or size of prescriptions; and 4) mandatory substitution of generic products.

The measurement of access can present problems since ideal measures are not generally available. For this report access is measured using several indicators: 1) percentage of pharmacies

participating in Medicaid; 2) number of participating pharmacies per enrollee; and 3) number of prescriptions per enrollee. The number of participating pharmacies was measured at two cut-offs : 1) if the pharmacy submitted even one claim; and 2) if the pharmacy's Medicaid prescriptions accounted for five percent or more of its total volume. Data from a (50%) sample of pharmacies were used in deriving the number of participating pharmacies. Additional insight on access was gained by examining the participation rates of pharmacies by type (large and small chains and independents) and using additional information provided on the location of pharmacies by level of poverty within each county area.

The key findings of this study can be summarized in each of the major areas of the analysis:

Adequacy

- Overall, States are paying 95-100 percent of estimated total average costs, before profits, of dispensing drug products;
- States tend to pay more than average costs for the ingredient component but not for the dispensing cost component; and
- No clear patterns are seen in the relationship of payment to costs by geographic region.

Access

- Participation rates of pharmacies based on submission of one or more claims are uniformly high across the States, averaging 86 percent while rates based on provision of five percent of total volume are lower, averaging 68 percent;
- Pharmacies tend not to locate in areas of high poverty where Medicaid enrollees may be more likely to reside;
- Participation rates based on one or more claims were lower overall for independents than for chain pharmacies but participation rates were quite similar when based on five percent or more of total prescriptions; and
- The relationship of State payment to an estimate of average total costs before profits does not appear to affect participation rates, based on the results of this study.

These findings imply that State payments for pharmacy services are not a cause for concern. Although the majority of States reimburse pharmacies at a level that is very close to their average costs, as estimated in this study, these payments are generally not generating a positive margin. On the other hand, States are paying above estimated marginal costs and pharmacy Medicaid participation rates are high. Importantly, the results in this study are inevitably based on averages. Pharmacies that incur higher or lower than average costs may, alternatively, not be adequately paid or receive windfalls

Finally, there may be specific areas within a State where access problems exist, but this study could not focus on areas smaller than the county.

This study was limited by lack of data on the dollar amounts actually paid by pharmacies within each State for the drugs purchased and dispensed. Lack of these data required using regional data on pharmacy purchases and making assumptions about the relative ability of large and small chain and independent pharmacies to obtain discounts from these amounts. The regional data do not include off-invoice discounts and hence, these data may overstate actual costs. The study also had to simulate the amounts paid by Medicaid in each State. Simulated payments are likely biased upward since States actually pay the lower of usual charges and costs as estimated by their payment formulae (and simulated here). Even though these are shortcomings of the current study, estimates of acquisition costs in all States have not been heretofore available, especially based on the same method for deriving each State's adequacy measure. In addition, the simulated payments and comparisons of them to the estimated costs generated reasonable results and were found comparable to other measures of State payment where available.

Other shortcomings of the study relate to issues that could not be examined at all given the data and resources allocated to this study. For example, there were inadequate resources to examine the level of Medicaid payments relative to that of other third parties. Other limitations included the limited ability to look within geographic areas (counties) such as inner city areas and/or high poverty areas where lack of access may cause problems, the lack of information on the role that hospital-based pharmacies play in providing Medicaid enrollees access to pharmaceutical services either overall or in inner city areas and the inability to look at issues over time. Another limitation was the lack of resources to examine in depth the adequacy of payments to other providers, such as physicians, who play an important role in overall access to care.

The provision of accessible and high quality pharmacy services is essential for Medicaid recipients when they experience episodes of acute and/or chronic conditions. The findings of this broad study provide some insight regarding the adequacy of Medicaid reimbursements and the access of Medicaid enrollees for pharmacy services. Overall, it indicates that payments are in line with costs and participation rates are high. Still, given the limitations of the present study, States may need to gather further information to fully understand the dynamics of pharmacy payment methods and enrollee access.

In the multivariate analysis that was part of this study, the effects of other State policies (e.g., co-pay, drug utilization review, prior approval, etc.) were found to have little impact on access measures. However, States should be aware of how all their drug policies work independently and together to provide access to high quality services.

Moreover, States should review physician participation within their Medicaid programs and how it relates to enrollee access for needed primary care as well as pharmaceuticals. Indeed, the focus may be properly placed not only on payments to pharmacies but also on payments to physicians since the latter show lower participation rates and are the first step in access to medical care.

Since this study could not gather ideal or detailed measures of access, States may wish to monitor access of enrollees using either claims or survey data. Information on access for enrollees in various geographic areas throughout the State would be useful in this monitoring process. The access issues that may arise in inner city areas where enrollees are concentrated for example, may be quite different from those that affect enrollees residing in other city, suburban or isolated rural environments. Travel distance and time should be explored for all areas.

This study did not address the overall goals and structure of payment methods but some statements can be made regarding this issue. In general, it is difficult for public payers to gauge the right level of payment for all pharmacies. Clearly, the most efficient administrative method is to develop an average payment that does not vary across pharmacies. The concern with this policy is that some pharmacies will be "overpaid" while others will be "underpaid" with respect to average costs. Public payers may wish to vary average payments across pharmacies if there are factors beyond the control of the pharmacy (e.g. crime in the area, labor costs, etc.) that also affect the access of enrollees. If States find there are particular areas with access problems, changes in the payment structure might also be constructive. For example, if there are non-participating pharmacies located in areas with high concentrations of poverty and there are demonstrable access problems, these particular pharmacies could be given financial incentives to encourage participation. In addition, further research is needed on the role of hospital-based pharmacies in providing services to enrollees, especially in the inner city areas.

This study provided some insight on the adequacy of State payment for pharmacy services. However, data on actual costs and payments would allow for a better analysis of the adequacy of payment and the implementation of any alternative payment methods. Through either accounting data and/or cost surveys, States could improve their understanding of the differences in the costs of

dispensing drugs between smaller versus larger pharmacies, chains versus independents, and pharmacies located in urban versus rural areas. Although it appears that across the States relatively low payments for dispensing fees are balanced by relatively high payments for ingredient costs, States may want to better align payments with each component cost (ingredient and dispensing) before considering restructuring of payment methods. Medicaid payments could then work in tandem with competitive pressures to produce pharmacy services at the lowest per unit costs.

If payment policy is believed to be an effective tool for influencing pharmacy behavior, States might consider incentives that encourage efficiency in dispensing and the use of generics. Alternatively, if a competitive bid process could be used to determine the lowest price at which pharmacies in a certain area are willing to provide services, this could be an optimal arrangement if the average costs of a competitive market are thereby revealed. However, it is important to realize that some pharmacies might bid at marginal costs which may not be sustainable in the long-run. There would also be numerous complexities to address in terms of the spatial location of the pharmacies with the lower bids, the number of bids to accept, the terms of the contract between public payer and pharmacy and dissemination of information of participating pharmacies to enrollees. If undue travel burdens are not placed on enrollees as a result of competitive bidding, such a policy could be beneficial to all.

It does not seem that it is the role of the public payer to assure that the average costs of all pharmacies are covered. Certainly, it should not seek to cover the costs of a pharmacy that is either inefficient and therefore has higher average costs, nor one that sets prices higher than average in order to make excessive profits. It also is not necessary that all payers pay average costs. As the theoretical model used in this study highlights, Medicaid can pay less than average costs and still induce participation among pharmacies as long as payments are in excess of marginal costs. Public payments that are less than average costs might be justified on the basis of increased demand/volume for providers; similar "discounts" may be achieved by HMOs through negotiation and contract. On the other hand, if the public payer consistently pays below average costs, inclusive of a typical rate of profit, the pharmacy, as any other provider, may seek to recoup these "losses" by charging higher prices to private payers than they otherwise would. This could impact on the financial stability of providers that rely heavily on payers that are paying below average costs, perhaps eventually affecting access.

While the lack of detailed data prevented a more definitive study, the State-level analyses presented here provide baseline information for future studies to address in more detail access to pharmacy services by Medicaid recipients.

I. INTRODUCTION

Medicaid expenditures are growing faster than any other State budgetary expense. Total Medicaid expenditures for the Nation grew by 27 percent in 1991 alone (Feder et al., 1992). Projected Medicaid growth rates substantially exceed expected growth in Medicare and, if realized, make Medicaid the fastest growing component of the Federal budget as well. While prescription drugs account for only approximately seven percent of total Medicaid expenditures nationally, they have been one of the fastest growing components within the program. Drug benefit expenditures in the average Medicaid plan rose 75 percent overall, more than doubling in 10 States from 1984 to 1988 (Pryor, 1990). From 1990 to 1991, Medicaid dollars spent on prescription drugs grew by an average of 25 percent across the country while overall expenditures grew by 27%. Yet, drug expenses as a percentage of the total Medicaid budget have risen only slowly from 5.9% in 1985 to 6.5% in 1991.[2]

It appears that prescription prices rather than utilization increases are the main reason for the increases in expenses. Retail prescription prices, as a component of health care expenses, had the highest inflation rate during the 1982-88 time period (Schondelmeyer, 1990), and their continued growth has recently drawn national attention. Even though the industry argues that pharmaceutical inflation has been slowing recently, pharmaceutical price inflation grew by 6.3 percent from June 1991 to June 1992, while overall inflation at the manufacturer's level grew by only 1.5 percent (United States Senate, 1992).

While the key reasons cited for the recent growth in Medicaid expenditures (Holahan et al., 1992) have not included prescription drug expenses per se, increases in drug prices and expenditures are of great concern to State and Federal policy makers. Federal legislation during the late 1970's used direct cost controls to curb Medicaid expenses, but States were given more flexibility to set their own limits in the latter part of the 1980s. States sought to control expenses by reducing pharmacy reimbursement, raising coinsurance and limiting prescriptions directly or through restrictive drug formularies. Twice as many States restricted drug benefits as liberalized them in the 1980s. This helped raise concern over access to pharmaceutical services at the same time a general concern with provider availability in Medicaid developed.

[2]Data used to calculate this growth rate were HCFA 2082 data (aggregate State data on expenditures and enrollees) which were cleaned and edited by The Urban Institute under contract to the Robert Wood Johnson Foundation.

Although the 1991 data indicate Medicaid expenses for prescription drugs continue to escalate, these data do not reflect the net impact of recent legislation on Medicaid expenses. As part of the Omnibus Reconciliation Act (OBRA) of 1990, drug manufacturers must pay directly to Medicaid programs rebates that at least equal the difference between Average Manufacturer's Price (AMP) and "best price" offered anywhere (limited to 25 percent of AMP in 1991). This program was expected to save the Medicaid programs significant amounts of money, yet not restrict the access of enrollees to pharmacy services. Payment levels to pharmacies cannot be reduced from their January 1991 levels until 1995. Adequacy of payment and access had become a concern during the mid-1980s under Federal Maximum Allowable Cost (MAC) constraints. These Federal maximums were the upper dollar limit that could be paid under a State Medicaid program for certain multi-source drugs. States can now set maximum payment levels that are different from the Federal upper limit. This allows them more flexibility in administering their drug reimbursement program.

1.1 PURPOSE AND SCOPE OF WORK

The purpose of this study is to describe the adequacy of State Medicaid payments to pharmacies, as measured by their relationship to average costs, and to measure the effect of these payment levels on access of enrollees to pharmaceutical services for a recent year. A major determinant of whether a pharmacy decides to provide services to Medicaid enrollees may be the adequacy of State payment for the cost of obtaining and dispensing prescriptions to Medicaid enrollees. If profit margins for Medicaid services are too low, pharmacies may be inclined to limit their involvement in the Medicaid program. Although the adequacy of payment could be measured by comparing Medicaid payments to those of other third parties, a more direct measure is the relationship of State payments to the cost of obtaining and dispensing drug products. The weakness of this approach is that estimates of these costs have been difficult to obtain, especially across all States. A major goal of the present study is to derive estimates of costs for each State.

With measures of the relationship of State payments to costs, it is possible to make an assessment of any impact that this may have on the access of Medicaid enrollees to pharmacy services in each State. Section 4401(d)(4) of the Omnibus Budget Reconciliation Act of 1990 (OBRA 1990) requires the Secretary to conduct an examination of both the adequacy of State payments to pharmacies and its relation to access of enrollees. As noted, the emphasis of State and Federal policy on cost containment raised concerns over potential problems with access to pharmacy services. There is a general concern with the accessibility to all types of providers for Medicaid enrollees and its relationship to reimbursement levels and other factors (e.g., burdensome paperwork); OBRA 1989 instructed States to increase provider fees so that obstetrical

and pediatric services are available at least to the extent such services are available to the general population. The second goal of this study is to examine several measures of enrollee access and assess the relationship of payment levels to these access measures.

Besides the adequacy of payment for pharmacy services, other key determinants of pharmacy participation include residence of Medicaid enrollees relative to participating pharmacies and other State policies concerning coverage of drugs. As for physician services, the residence of enrollees in areas in which pharmacies are less likely to locate may create problems of access to pharmaceutical services. For example, pharmacies may be less likely to set up business in the inner urban areas in which many enrollees reside. Under OBRA 1990 States could no longer include restrictive formularies, States can affect access to specific drugs by requiring prior approval, setting State MACs, and requiring generic substitution. In addition, State policies determine the eligibility of poor persons in a State to enroll in Medicaid, which is the first step to access under this program. This study attempted to take these factors into account when examining access to pharmacy services in each State. OBRA 1993 amended the provisions of OBRA 1990 to allow States to again establish restrictive formularies beginning October 1, 1993. However, these provisions became effective after the conclusion of this study.

While Federal Medicaid regulations dictate the method for reimbursing prescription drugs, it is ultimately the interaction of Federal and State policies that determine the level of State payments for pharmacy services and hence, access for enrollees. States have significant flexibility in their Medicaid eligibility and payment policies. The challenge for this study is to examine the issue of adequacy of State payment and enrollee access at a national level, recognizing that the unique circumstances of each State may affect these outcomes.

The focus of this study is on data and measures that are available and consistent for all, or the majority of, States for a current time period. Because some issues surrounding access (e.g., distance to nearest pharmacy, closures, etc.) would require data within States and perhaps, cities, this type of analysis is not the focus of this report. By examining data for the Nation as a whole, the study provides a better understanding of Federal drug payment policy, how it is implemented in each State, and a comparative understanding across States. Some measurements and analysis are presented, however, at the county level for a regionally representative set of States chosen to more fully test some of the hypotheses surrounding pharmacy participation.

1.2 BACKGROUND

In this section and the remainder of the report, numerous definitions of terms specific to the pharmaceutical industry are introduced. To aid the reader, we have provided a glossary of terms, shown in Table 1.1. This can serve as a reference for much of the following text.

Table 1.1
Definitions of Terms Specific to the Pharmaceutical Industry

TERM	DEFINITION
Actual Acquisition Cost (AAC)	Pharmacist's net payments made to purchase a drug from any source (e.g., manufacturer, wholesaler) net of discounts, rebates, etc.
Estimated Acquisition Cost (EAC)	An estimate of pharmacies' actual acquisition costs that are made by the States and other third-party payers.
Maximum Allowable Cost (MAC)	A maximum dollar amount for which the pharmacist is reimbursed for selected products.
Average Manufacturer's Price (AMP)	The average price paid by wholesalers to manufacturers for products to be distributed to retailers.
Average Wholesale Price (AWP)	The manufacturer's suggested wholesale price to the retailer which is listed in either the Red or Blue Book.
Wholesale Acquisition Cost (WAC)	The wholesaler's net payment made to purchase a drug product from the manufacturer, net of purchasing allowances and discounts.

It is also helpful to consider how these terms relate to the adequacy measures estimated by this study. There are two components to this measure: dispensing and ingredient. All of the terms in Table 1.1 relate to the latter component. With respect to drug ingredients, the cost to the pharmacist is referred to as the Actual Acquisition Cost (AAC). Given the complexity of measuring these costs, States have used an approximation which is referred to as Estimated Acquisition Cost (EAC).

The information used to estimate these acquisition costs is generally the Average Wholesale Price (AWP) which is not, however, a direct measure of true acquisition costs. This is actually the suggested wholesale price to the pharmacy; in reality, wholesalers compete with each other by offering pharmacies different discounts from this price. In addition, some pharmacies purchase directly from the manufacturer, skipping the wholesaler entirely and thereby reducing costs. Estimates of the range of discounts from AWP available to pharmacies include 10-18 percent (HCFA, 1992). In light of this,

the majority of States estimate acquisition costs by deducting a percentage from the published AWP. Others use information on the Wholesaler's Acquisition Cost (WAC) and add a certain percentage. This reflects the fact that wholesalers commonly add a percentage mark-up to their own acquisition costs when establishing a price to charge the pharmacy. Ultimately, these State estimates may be an under- or over-statement of actual costs. This study uses data on wholesalers' invoices to pharmacies by region to gain some insight on pharmacists' AAC by State.

1.2.1 Legislation

Over the years, there has been significant Federal legislation on Medicaid payment policy for prescription drugs. The impetus for this legislation has often been the desire to control program costs for prescription drug benefits. As noted, controls on the amounts paid for the ingredient cost of prescriptions had been in the form of Federal upper limits, or MACs, but concerns with access led to increased flexibility for the States. MAC refers to a set dollar limit above which pharmacists can not be reimbursed for selected products. In 1987, under new Federal regulations (52 FR 28648), States were given more flexibility in establishing these MACs and other payment methodologies. State reimbursement policy now varies for the drugs which are multi-source and those which are not. For the multi-source drugs, there can be State MACs in place that differ from the Federal maximums, although States' payments must stay within the Federal aggregate expenditure limits. For other drugs, States reimburse for the lower of the pharmacy's usual and customary charges or the EAC as estimated by the State.

Section 4401(d)(4) of OBRA 1990 requires the Secretary to conduct a "Study on reimbursement rates to Pharmacists." The specific mandates for the study are to determine:

"(i) the adequacy of current reimbursement rates to pharmacists under each State medical assistance programs (sic) conducted under Title XIX of the Social Security Act; and

(ii) the extent to which reimbursement rates under such programs have an effect on beneficiary access to medications covered and pharmacy services under such programs."

The 1990 law did not provide for any increase in the allocations for pharmacy payments, but there can be no reductions to drug product and dispensing fee reimbursements from their January 1991 levels until 1995. However, changes in terms of the requirements for prior approval (excluding newly approved pharmaceutical products for six months), requirements for use of generic substitutions, and under prior approval programs, response within 24 hours of a given request, may lead to increased paperwork and uncertainty for pharmacies. OBRA 1993 amended provisons of OBRA 1990. States may subject any covered outpatient

drug to prior authorization. However, this provision was not in place at the time of this study. Pharmacies may inadvertently dispense drugs that are not approved or are not the required generic. This could adversely affect their profits as the State will reimburse at the MAC level only for multiple-source drugs and may deny reimbursement altogether for those dispensed without prior approval. Thus, pharmacies may be operating within a more complicated Medicaid environment that might discourage their participation.

1.2.2 Pharmacy Industry

In analyzing the pharmacy payment, it is important to recognize some salient characteristics of the pharmacy industry and recent changes. First, the structure of the industry is varied as prescription medications are dispensed in a variety of settings. These include: 1) independent pharmacies that provide goods and sundries in addition to prescriptions and that operate as small business entities; 2) professional pharmacies that sell only prescriptions and that operate as small business entities; 3) chain pharmacies, that may be freestanding or located within a grocery or other type of retail store and which buy pharmaceuticals in volume; 4) pharmacies situated in health clinics, hospital outpatient departments and HMOs; and 5) mail order pharmacies that offer prescription drug services to specially enrolled groups. This study does not include information on either of the last two settings.

Other aspects of the industry also make cost analysis difficult. For many providers, drugs are not the only type of goods sold or services provided. Moreover, Medicaid is a relatively small fraction of the total business for most providers. Independents have historically provided a larger percentage of their services to Medicaid enrollees than chain stores have. Whereas Medicaid covered 18.9 percent of all retail prescriptions in 1989 (Schondelmeyer and Thomas, 1990), Medicaid prescriptions accounted for more than 23.5 percent of all prescriptions dispensed by independents and only 11.2 percent of those dispensed by chain stores. Finally, much of the cost of providing prescriptions, the ingredient costs, are not under the direct control of the pharmacy.

An important trend in the pharmacy industry is the continued decline in the importance of the smaller, independent pharmacy. While the total number of retail community pharmacies has held relatively constant, the number of independents has decreased. In 1950, 92 percent of all pharmacies were independents; by 1970, this number had declined to 87 percent and by 1992, independents represented only 55 percent of the approximately 57,000 retail community pharmacies. The causes of this decline are many. One factor may be the increased role of third-party reimbursement; another may be the inability of smaller pharmacies to effectively compete. If there is a difference in the location and/or propensity of independents

and chain pharmacies to participate in Medicaid programs, the declining number of independents may affect access of Medicaid enrollees.

1.2.3 Medicaid

As noted earlier, issues surrounding pharmacy reimbursement in Medicaid must be considered in light of the dramatic increases in the growth rate in expenditures experienced by the majority of States. While prescription expenditures remain a relatively small percentage of the total, this perhaps understates their importance in the overall management and treatment of an episode of illness and/or chronic condition. In many instances drugs can, when used appropriately, effectively lower total expenditures for an episode of illness from what they might otherwise be. Thus, in efforts to control overall program outlays, Medicaid drug payment policy must consider not only the role of payment policy in affecting total expenditures but in creating an environment for access to appropriate and effective drug therapy.

Overall, States are directed to pay on a retrospective fee-for-service basis with payments limited to the lower of 1) the pharmacy's usual and customary charge, or 2) the EAC of the drug product plus an established dispensing fee to cover the pharmacy's overhead and profit. Medicaid payment policy for pharmaceutical services varies from State to State in terms of the drugs covered by MACs, the basis of payment for drugs (e.g., AWP or WAC), the level of the payment for dispensing fees, and other aspects of the payment program that can affect access. Furthermore, there are factors other than the reimbursement amounts that will affect pharmacy profits and beneficiary access. In particular, access may be affected by the continuation and/or implementation of Prior Authorization (PAR) programs, which are being used by States to control the drugs that are reimbursed within each Medicaid program. That is, in spite of the agreement that all drugs of a manufacturer involved in the rebate program are to be reimbursed by Medicaid, States may be effectively restricting access by requiring prior approval. Some States are exempting only two or three drugs within a therapeutic class from PAR, others are considering a price based system where providers and beneficiaries will have unrestricted access only to the "cheapest" drug within a therapeutic class. Such programs may compromise access to certain drugs for Medicaid beneficiaries.

II. METHODOLOGY AND DATA SOURCES

2.1 METHODOLOGY

2.1.1 Research Questions

This report addresses research questions in two major areas: the adequacy of State payment and the access of Medicaid beneficiaries to pharmacy services. The key questions include:

Adequacy

- Do average variable and/or marginal costs of pharmacies decline with volume?
- Are State payments adequate in relation to the costs of dispensing drugs; are they generally above marginal costs?
- How do State delays in payment affect adequacy of payment?
- What State characteristics relate to adequacy of payment?

Access

- How do measures of access vary across States?
- What is the relationship between the adequacy of State payment to these measures of access?
- What other factors affect access?

To answer these questions, 1991 data from several sources were used to derive key measures of payment adequacy and access. Both descriptive and multivariate analysis were used in the analysis. The State-level analyses included all States except Arizona, due to the peculiarities of its Medicaid program. The District of Columbia has been included in the analyses and data are presented where available; the District has been omitted, however, from State averages where they are presented.

The following description of the methods used in this report contains six major sections: 1) Data Sources; 2) Market Basket of Drugs; 3) Methods for Measuring Costs; 4) Methods for Measuring Adequacy; 5) Methods for Measuring Access; and 6) Multivariate Analyses.

2.2 DATA SOURCES

Several data sources were used to complete this study. These data sets, their role in the overall analysis and issues addressed in using them are briefly summarized in Table 2.1.

A significant amount of data was drawn from the data bases available through IMS America. These are described in more detail in Appendix A. The primary uses of these data were to derive State-level estimates of the pharmacies' ingredient cost for a market basket of drugs and participation rates of pharmacies by size and type. The data needed for these purposes came from two separate sources at IMS America—the U.S. Drugstore Audit and the Prescription Data Base. Wholesale data from the U.S. Drugstore Audit data base were the primary source of information used to generate the average per-unit costs for a market basket of drugs. The per-unit costs were derived from all sales (not just those related to Medicaid) made by wholesalers to chains and independent pharmacies during the 4th quarter of 1991 at the regional level. These dollar values were the basic building block for the derivation of ingredient cost estimates for each drug and in each State. Note that these amounts do not reflect discounts that occur off-invoice (e.g., off-invoice rebates and discounts for payment within 30 days), and hence may overestimate true acquisition costs.

Data from the Prescription Data Base were used to move from the regional to the State level by using the counts of chain and independent pharmacies in each State along with the per-unit cost data from the U.S. Drugstore Audit. The Prescription Data Base file was also used to provide counts of pharmacies participating in Medicaid at the two cut-off points and estimates of total prescriptions by payor source (cash, Medicaid, other third party); these were provided by county (and 5-digit zip code areas within these counties for some States and for summary zip code areas in others). IMS retains data by zip code in order to extrapolate their sample data based on characteristics of the pharmacies and population within the zip code. Pharmacies are characterized on the basis of size (under and over $45,308 in monthly sales and chain/independent). Zip codes are characterized by the level of poverty (1990 Census data). The three cut-offs are: 1) High = income level for >30% of the population is below 125% of poverty; 2) Medium = income level for between 15% and 30% of population is below 125% of poverty; and 3) Low = income level for 15% or less of the population is below 125% of poverty level.

These data were drawn for the month of December 1991. In addition, IMS America provided the total number of pharmacies within each State and for a subset of counties by several types of pharmacies and zip codes within counties. While the type of store was known in the aggregate, no

Table 2.1

Data Sources, Key Variables and Issues in Completing Analyses

	ADEQUACY			ACCESS	
	Ingredient Costs	Cost Structure and Dispensing Costs	State Payment	Measures of Access*	Other Factors
Source, Year and Key Variables:	IMS America, 4th Quarter, 1991 Average wholesale transaction price per unit for all brand and generic forms and strengths of market basket of drugs frequently dispensed within the Medicaid program, by region	1) Lilly Digest Survey, 1988, 1989, 1990 Expenses by category (e.g. wages, rent, insurance, etc.), by volume, size and geographic region 2) National BioSystems (NBS), 1990/91 State surveys on dispensing costs (years vary) 3) Other Surveys: State-specific (North Carolina, 1991; Rhode Island, 1990) and Schafermeyer et al., 1990, Final Report for National Association of Chain Drug Stores	1) National Pharmaceutical Council (NPC), 1991, 1992 Dispensing fees, ingredient reimbursement basis and other State payment characteristics 2) National BioSystems (NBS), 1990/91 Electronic billing, delays in payment 3) First Data Bank (FDB), 4th Quarter, 1991 AWP, WAC, MACs and other State coverage policies for market basket of drugs 4) Tape-to-Tape Volume and expenditures for drugs dispensed to Medicaid enrollees in three States	1) National BioSystems (NBS), 1990/91 Pharmacies active in Medicaid; enrollee counts by State and county 2) IMS America, December 1991 Total pharmacies and those active in Medicaid at two cut-off points by pharmacy size and type for all States and selected counties** and zip code areas within these counties 3) 2082 Data 1991 Consistent data on enrollees, prescriptions and drug expenditures by State	Area Resource File (ARF) 1990 Income, population, physician and hospital supply, etc.

*State (and selected county) level: Percent of pharmacies participating, participating pharmacies per enrollee and prescriptions per enrollee.

**Data for counties in the following states were used: Arkansas, California, Florida, Illinois, Kentucky, North Dakota, Ohio, Pennsylvania, South Carolina, South Dakota, Utah, Washington, West Virginia, Wisconsin and Wyoming.

Table 2.1 (Continued)

Data Sources, Key Variables and Issues in Completing Analyses

	ADEQUACY			ACCESS	
	Ingredient Costs	Cost Structure and Dispensing Costs	State Payment	Measures of Access[a]	Other Factors
Issues:	Low or no transaction volume for some products and regions; data on variation around average per-unit price for approximately 40 products used to assign State-specific means	Many assumptions made due to lack of comparability in surveys of independents (Lilly Digest) and chains; variation in State-specific surveys and lack of national coverage required use of other proxies of dispensing costs	NPC data supplemented with State calls; missing data from NBS restricted some analyses; inability to link all drug products and some missing price data in FDB reduced market basket in final analysis	IMS and 2082 data chosen for most access analyses; sample weighted methods used to extrapolate IMS data	Some data not current as of 1990/91

information on individual stores was made available by IMS America. These data were used as a base for the participation rates and to derive sample weights.

Data from First Databank were used in the simulation of State payments for the market basket of specific drugs. As noted, States reimburse largely on the basis of AWP or WAC. First Databank maintains data on these prices, for current as well as historical periods, in quarterly files. It also contains information on Federal upper limits and State MACs, where applicable, for each specific drug product. Data are retained by unique National Drug Codes (NDC) currently in place for specific products. Data contained in the First Databank on AWP, MACs, drug coverage and need for prior approval in each State were pulled for the last quarter of 1991 from the 4th quarter tape.

The Tape-to-Tape data were used to determine the Medicaid population's drug usage. Data on total prescription volume and dollars were used to help derive: 1) the initial market basket; 2) average product size; and 3) expenditure weights for the drugs in the final market basket. The Tape-to-Tape data are a HCFA-funded and maintained data base that contains all enrollment claims and provider information for four States (California, Georgia, Michigan, and Tennessee). Only data from three of these States (California, Georgia and Michigan) were used in this study. Data from 1990 were the most recent available.

The major source of data on the costs of operating an independent pharmacy is the Lilly Digest (1988-90). The Lilly Digest data are derived through a voluntary survey of participating independent community pharmacies across the country. These surveys collect data on types of pharmacy costs (e.g., rent, wages, depreciation, etc., by prescription volume) and were used to give insight into the variation in dispensing costs across chains versus independent pharmacies, those with different sales volumes and those in different geographic areas. These data also provided information on the relative magnitude of the fixed and variable costs involved in purchasing and dispensing prescription drugs. A strong caveat concerning these data is that only approximately five percent of independents responded to the Lilly Digest survey. Furthermore, the Lilly Digest makes no attempt to define or structure the sample. Although a five percent sample might be adequate in terms of the number of pharmacies needed to derive reliable averages, there is no assurance that the sample is representative of the independent community pharmacies across the Nation. Given these problems, the data were used primarily in a descriptive sense and to gain an understanding of the overall cost structure of these two pharmacy types.

Data on the fixed and variable costs of chain drug stores were derived from a national survey supported by the National Association for Chain Drug Stores (Schafermeyer et al., 1990). This survey was based on a nationally representative sample of chain pharmacies. The overall response rate was almost 47 percent, or 797 out of 1,705. Only 695, however, had usable data.

The National BioSystems Survey of State Medicaid Agencies was used to derive State measures of: 1) the delay in payments made to pharmacies; 2) measures of pharmacy dispensing costs; and 3) county measures of enrollees. The National BioSystems data are the only source for the county level measures of enrollees and this helped determine the States for which county level data were obtained from IMS America: Arkansas, California, Florida, Illinois, Kentucky, North Dakota, Ohio, South Carolina, South Dakota, Utah, Washington, West Virginia, Wisconsin, and Wyoming. (Kentucky and North Dakota county data reported by National BioSystems were for recipients; these were adjusted to derive estimated enrollee counts.)

Enrollee counts at the State level, however, were also available from HCFA 2082 data; these were used instead of the National BioSystems data since these latter data were often counts of recipients rather than enrollees. Although States have historically reported only recipients on their 2082 reports, beginning in 1991 these reports include enrollee counts.

Several variables were drawn from the Area Resource File (ARF) for use in the analysis of county pharmacy participation rates and prescriptions per enrollee. The ARF is a public-use data base that is maintained by the Office of Data Analysis and Management, Bureau of Health Professions. This data base is county-based and contains numerous characteristics of counties including population, hospital and physician supply, income per capita, etc.

Data from the National Pharmaceutical Council (NPC) provided details on the methods used by States in a given year to determine the payment to pharmacies for both pharmacy dispensing fees and ingredient costs. These were used in conjunction with price data, including AWP, from First Databank to simulate State payments. This data base also included information on total number of pharmacies by type, number of prescriptions filled, total dollars paid, and total State enrollees; these data were largely used as checks on data from IMS America and National BioSystems. Characteristics of the State Medicaid programs from this source were used in regressions as independent variables.

Finally, hard copy data were used to derive State and county measures needed in the analysis. For example, the percent uninsured in each State was provided by The Urban Institute (and was

derived by their staff from pooled years of the Current Population Surveys). Data on the variation in certain types of input prices (e.g., hospital labor) were taken from Commerce Clearing House Reports on regulations for the Prospective Payment System and from a special study of physicians' practice costs completed earlier (Zuckerman et al., 1990).

2.3 MARKET BASKET OF DRUGS

Before we could derive the cost and payment measures for the drug ingredients, we had to first decide which specific drugs to include in the analysis. To do this, a market basket of drugs most representative of those dispensed to Medicaid enrollees was derived. Since this market basket was used in both the derivation of cost estimates and the simulation of State payments, we first discuss its derivation before moving on to the methods used in estimating costs and payments.

The derivation of the market basket began with a list of drugs appearing in the top 150 (based on expenditures) drugs dispensed in Medicaid in four States, California, Georgia, Michigan and Wisconsin. Both expenditures and volume were originally used to rank products, but were found to largely overlap. Data for expenditures in the first three States were drawn from the Tape-to-Tape data set maintained by HCFA; data for Wisconsin were made available through the University of Wisconsin's School of Pharmacy. An initial market basket was formed by including those drugs which appeared on two or more of the States' listings of the top 150; drugs ranked on number of claims were compared to this list and high volume drugs not on the high expenditure list were classified as potential additions. The initial market basket was condensed to remove duplicate dosage and strength forms and to focus primarily on solid, oral forms of the drugs for which units (tablets, capsules, caplets, etc.) are easier to interpret. This left a total of 75 drugs. This list was augmented by 10 additional drugs, largely chosen on the basis of their claims rank, and the list was reviewed for representativeness by broad therapeutic group (e.g., cardiovascular, antibiotics, respiratory, hormonal, etc.) and by patent status (single or multiple-source). After HCFA review, a few deletions were made, an additional antipsychotic drug was chosen, and the final list tallied to 80. (This list is presented in Appendix B.) A final check was made by comparing this list to a hard copy list of the top 69 drugs dispensed under the Pennsylvania Medicaid program; all but four of the drugs in the Pennsylvania list were included in the market basket.

This list of 80 drugs was sent to IMS America[3] for them to identify all of the drugs' forms, dosage strengths and package sizes, both brand and generic. This resulted in a list of almost 2,000 related drug products. This list was diminished by deleting most drug products that were not oral solids or that did not match any NDC codes in the First Databank[4] files or as other problems arose in the analysis. NDC codes are the identifying numbers maintained by the Food and Drug Administration, and are specific to manufacturer, dose and package size. Files through second quarter 1992 were searched for possible matches to NDC codes. There was only a handful of drug products which could not be matched using any methods (e.g., alpha search). As the analysis proceeded, some additional drugs were dropped if there was not meaningful data on AWP or WAC for the time period of interest (4th quarter 1991).

The final master list available for completing the derivation of ingredient cost and payment measures equaled a little over 1,600, a sample sufficiently large to be representative of a State's payment adequacy. Data on ingredient purchasing costs were provided by IMS America at the regional level and extrapolated to the States based on assumptions about prices paid by large and small chains and independents and the volume accounted for by each of these pharmacy types in each State. The final market basket varied in each region due to the small or negligible volume in certain drug products in that region. The final market basket, therefore, varies somewhat from State to State. In addition to a lack of volume within a region, States' market baskets were affected by missing data. For example, Wholesale Unit Price, taken from First Databank to measure WAC in States which use this in their formulae, was sometimes missing.

The second step in deriving the adequacy of payment involves the estimation of the amounts paid by the Medicaid programs in each State. These amounts were simulated by using information on each State's payment formula for ingredient costs, dispensing fee amounts, and other details that could be incorporated into the simulation. For example, adjustments were made to recognize: 1) State MACs; 2) States which use a range on dispensing fees and/or pay incentives; 3) differences in the

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[3]IMS America is a subsidiary of IMS International which has offices in over 40 countries. IMS America gathers data on costs and sales volume from pharmacists, physicians, laboratories, etc., largely in computerized form, to help these businesses devise marketing and sales strategies and to track the performance of their own and competing products. They collect data from over 175,000 sites across the United States.

[4]First Databank is a private company located in San Bruno, California which maintains data by individual drug on AWP and other price measures as well as state information on drug coverage. MACs, etc.

average product size dispensed due to limits on the number or size of prescriptions; and 4) mandatory substitution of generic products. Payment amounts simulated were found reasonable, compared to other data on expenditures per prescription (NPC, 1992). Note that the simulated amounts are greater than actual payments since States pay the lower of actual charges and estimated costs.

Both the State payment and ingredient cost estimates for specific drugs (at the dose and strength level) were weighted by an average prescription size in order to derive an estimate of the ingredient cost per prescription. Once weighted, these estimates could be added to the State dispensing fee, which is at the prescription level, to derive a total payment. To derive a summary measure, expenditure weights were used to represent the relative importance of each prescription in the overall market basket. Both the average prescription size and the expenditure weights were derived from the Tape-to-Tape data set for the three States noted earlier.

2.4 METHODS FOR MEASURING COSTS

The overall cost structure of pharmacies is somewhat difficult to describe, given the variety of settings in which pharmacy services take place (e.g., hospitals, independents, chains, supermarkets, etc.) and the fact that for many, drugs are not the only type of goods or services sold. The focus in this analysis is on the overall cost structure of the industry rather than on certain types and/or settings, where possible, differences between chains and independents are highlighted. The results, based on the survey data provided by *Lilly Digest* for independents and on a national survey for chains (Schafermeyer et al., 1990), are discussed separately for overall costs and dispensing costs. Ingredient costs are discussed later using data from IMS America; analytical methods used for estimating both ingredient and dispensing costs at the State level are also discussed in this section.

2.4.1 Overall Cost Structure

We have used a theoretical model (presented in Appendix C) to help structure our analysis and to develop hypotheses. An underlying premise, drawn largely from this model, is that States can pay less than average total costs and still induce pharmacy participation, if the payment is above pharmacies' marginal costs. This premise is assumed to apply for the range of service volume produced by most pharmacies (i.e., this may not apply for very small or very large pharmacies).

In this model, we represent pharmacy costs as consisting of fixed costs of operation plus the variable cost of dispensing prescription drugs. Furthermore, average variable costs are assumed to be constant. We thus have constant marginal costs represented by a horizontal marginal cost (MC) curve and a declining average total cost curve approaching the marginal cost curve. This assumed cost structure is consistent with evidence that charges per prescription decline quickly with volume from small to medium size pharmacies, but then remain fairly even as pharmacy size expands. Average charge per prescription in 1990 was $38.83, $23,10, $21.45 and $20.22 , ranging respectively from small-(less than 25 prescriptions daily) to large-volume (125-150 prescriptions daily) pharmacies (*Lilly Digest*).

With the cost structure assumed by the model, average variable costs are equal to marginal costs. Given this, the model predicts that Medicaid participation results in greater profits for pharmacies, even if payments are below average total costs but at least as high as marginal costs. Once payment levels fall below marginal costs, however, the model predicts declines in program participation among pharmacies. By analyzing data on pharmacy average total and average variable costs we can estimate the ratio of marginal to total average costs under the assumption of constant marginal costs. This gives us a benchmark to gauge the adequacy measures estimated later.

In the following sections, the different components of prescription drug costs purchased through retail pharmacies are explored further. The intent of this analysis is to verify assumptions on the shape of the cost curves and to understand more fully their impact on the adequacy of Medicaid payments and pharmacy participation in the program.

The cost of a prescription drug at the retail level is comprised of two components: 1) the acquisition cost of the drug and 2) the dispensing cost of the prescription. The acquisition cost of the drug simply reflects the cost of ingredients for that particular prescription. Dispensing costs include salaries and fringe benefits for personnel, cost of prescription supplies, pharmacy licenses, rent, utilities, insurance and depreciation.

Net profit is the difference between total sales and expenses and represents the proprietor's return on his/her investment. The sum of the dispensing cost and an allowance for net profit yields the pharmacist's professional or dispensing fee. In our analysis of the adequacy of payment, however, we focus on only the ingredient and dispensing costs. The omission of profits from the cost estimates used in the analysis reflects the difficulties in defining or measuring "typical" profits.

2.4.2 Dispensing Costs

The pharmacy's dispensing costs can be broken out into fixed and variable costs, which can be further subdivided into direct and indirect components. Fixed costs are costs such as rent and utilities that do not vary by the amount of sales. Total variable costs, such as labor costs and the costs of supplies, increase with sales volume. Direct costs are those that are related solely to the operation of the prescription department of the pharmacy, while indirect costs are incurred on a storewide basis. Indirect costs arise because pharmacies sell other goods and services in addition to prescriptions. Therefore, to compute total dispensing costs, indirect costs must be allocated between the prescription and non-prescription departments. Fixed indirect costs are typically allocated by area ratio—that is, the ratio of prescription department size in square feet to the total square footage of the store. Variable indirect costs are allocated by the ratio of prescription sales to total store sales. The formula used to allocate these costs is as follows:[6]

$$\textit{Average Dispensing Costs} = \frac{FDC + VDC + (\beta_1 \times FIC) + (\beta_2 \times VIC)}{Rx}$$

where:

- FDC = fixed direct costs;
- VDC = variable direct costs;
- β_1 = ratio of average prescription department size in square feet to the average total square footage of pharmacies;
- FIC = fixed indirect costs;
- β_2 = ratio of average prescription sales to average total store sales;
- VIC = variable indirect costs; and
- Rx = total prescription volume.

The designation of costs between fixed and variable categories and even between direct and indirect categories is not always clear cut and, as a result, has varied among the different cost-of-dispensing studies. Because the area and sales ratios are significantly less than one, as well as significantly different from each other, the classification of expenses into the different cost categories can have a substantial impact on the average dispensing cost estimates. In the analysis below, the classification of costs used by Schafermeyer et al. in their study of chain pharmacies is generally

[6] This formula is attributed to Jean Paul Gagnon. See J.P. Gagnon. "Prescription Department Cost Analysis." *Pharmacy Management*, 151 (Sept.-Oct. 1979):235-240.

followed.[6] The actual assumptions used to define the various components of dispensing costs used in the analysis are described in turn below and summarized in Table 2.2.

Table 2.2
Allocation Factors for Dispensing Costs of Independent and Chain Pharmacies by Cost Category

COST CATEGORY	INDEPENDENTS	CHAINS
Fixed Direct Costs		
Proprietor's salary	100%	NA
Central administration	NA	(1)
Computer	100%	(2)
Variable Direct Costs		
Employees' wages	100%	(2)
Fixed Indirect Costs		
Rent	Average of sales and area ratios	Area ratio for fixed portion and sales ratio for variable portion
Utilities	Area ratio	Area ratio
Accounting	"	"
Taxes and licenses	"	"
Insurance	"	"
Interest paid	"	"
Depreciation	"	"
Variable Indirect Costs		
Miscellaneous costs	Sales ratio	(2)
Net Profits	Sales ratio	NA

NOTE: Cost categories are based on those reported in the *Lilly Digest* (Indianapolis, IN: Eli Lilly and Company, 1990).

(1) The total pharmacy central administration costs for chains were allocated to the individual store based on the store's percentage of total pharmacy sales. See K.W. Schafermeyer, S.W. Schondelmeyer and J. Thomas. *Final Report: An Assessment of Chain Pharmacies' Costs of Dispensing a Third Party Prescription*. Prepared for the National Association of Chain Drug Stores. 1990

(2) Pharmacy costs for these sub-categories were obtained in the survey of chain pharmacies. See Schafermeyer, et al., 1990.

2.4.2.1 Direct Costs

Direct prescription department costs include the costs of the pharmacist's time, computer costs, pharmacy licenses and fees, prescription labels and containers, and the costs involved in preparing and submitting third-party claims. In addition, Schafermeyer et al. included third-party bad

[6] K.W. Schafermeyer, S.W. Schondelmeyer and J. Thomas. *Final Report: An Assessment of Chain Pharmacies' Costs of Dispensing a Third Party Prescription* Prepared for the National Association of Chain Drug Stores. 1990.

debt expenses and third-party receivable carrying costs as direct prescription department costs in their study of chain pharmacies.

Unfortunately, direct and indirect costs for independent pharmacies were not distinguished in the *Lilly Digest* data. Therefore, we first had to decide which cost categories from the *Lilly Digest* data were direct and had to be wholly allocated to the prescription department. The remaining cost categories were considered indirect and are allocated to the prescription department as discussed below. We chose to wholly allocate the proprietor's salary, the employed pharmacist wages, and computer costs to the prescription department. The proprietor's salary accounts for his/her time behind the prescription counter, as well as his/her contribution to the store's administration. The latter contribution can be considered comparable to the chain pharmacy study's line item for central administration. In that study, central administration costs were allocated to each store in the chain based on the store's percentage of total chain prescription sales. No data are given in *Lilly Digest* on third-party receivable carrying costs or third-party bad debts. Therefore, for comparability, these two cost categories were subtracted out of the chain pharmacy figures.

Fixed direct costs for independent pharmacies are defined as the proprietor's salary plus computer costs; variable direct costs are defined as employee wages. These costs were wholly allocated to the pharmacy's dispensing costs.

2.4.2.2 Indirect Costs

Fixed indirect costs include utilities; accounting, legal and other professional fees; taxes; insurance payments; depreciation; interest payments; and a portion of rent. Variable indirect costs include advertising and promotion; merchandising; travel; a portion of rent; and miscellaneous costs.

In retail trade, stores are often charged all or a portion of rent based on total sales. The Schafermeyer et al. study of chain pharmacies allocated rent to the fixed and variable cost categories based on the method by which the chain store was actually charged. Unfortunately, they did not report the prevalence of the different methods, and *Lilly Digest* does not break out rent into fixed and variable components. We have assumed that half of rent was paid on a fixed payment method and half on a proportion of sales method, using the average of the area and sales ratios to define the proportion of rent to include in dispensing costs for independent pharmacies. The other fixed costs listed above were broken out in *Lilly Digest* for all reporting independent pharmacies. These costs were allocated to the prescription department based on the area ratio.

Variable indirect costs were not broken out in *Lilly Digest*. The miscellaneous cost category was the only cost category designated as variable indirect costs and allocated to dispensing costs based on the sales ratio.

2.4.2.3 Comparison of Dispensing Costs among Chains and Independent Pharmacies

Table 2.3 shows total estimated average dispensing costs per prescription for chain pharmacies in 1988 and for independent pharmacies each year from 1988 to 1990. These data indicate that in 1988, the dispensing cost per drug dispensed for chain pharmacies ($5.31) was approximately $.26 higher than the dispensing cost for independent pharmacies ($5.05). Costs for store personnel were approximately equal among the pharmacy types. However, the proprietor's salary is wholly allocated to store personnel for independent pharmacies (proprietor's salary is not applicable for a chain). If we subtract a portion of the proprietor's salary for administrative and other sales functions to make the personnel categories more comparable between the two pharmacy types, independent pharmacies

Table 2.3
Dispensing Costs Per Prescription Among Independent and Chain Pharmacies

	Chains[1]	Independents[2]		
	1988	1988	1989	1990
Dispensing Costs				
Store personnel	$3.69	$3.71	$3.88	$4.10
Other variable costs	0.29	0.80	0.86	0.95
Computer	0.32	0.09	0.10	0.09
Central administration	0.60	0.00	0.00	0.00
Rent	0.26	0.24	0.26	0.28
Other fixed costs	0.15	0.22	0.23	0.24
Total dispensing costs	$5.31	$5.06	$5.33	$5.66
Net Profits	---	$0.50	$0.56	$0.59
Dispensing fee	---	$5.56	$5.89	$6.25
Index of fee increase	---	1.00	1.06	1.13
CPI-drug component	---	1.00	1.09	1.20

[1] Tables 1-3, K.W. Schafermeyer, S.W. Schondelmeyer and J. Thomas, *Final Report: An Assessment of Chain Pharmacies' Costs of Dispensing a Third Party Prescription*. Prepared for the National Association of Chain Drug Stores, 1990.

[2] Table 1, *Lilly Digest* (Indianapolis, IN: Eli Lilly and Company various years.)

have lower average personnel costs when compared to chain pharmacies. Computer costs were lower for independents than chain pharmacies; rent was approximately equal among ownership types; and other variable and fixed costs were higher among independent pharmacies compared to chain pharmacies. The independents' higher costs in the last two cost categories may be captured in the chain's central administration category. In 1988, central administration added $.60 to the cost of each drug dispensed from a chain pharmacy.

Tables 2.4 and 2.5 break out dispensing costs by prescription volume for chain and independent pharmacies, respectively. *Lilly Digest* provided these data by less detailed cost categories. While employee wages, proprietor's salary and rent were broken out by prescription volume, all other costs were lumped into an aggregate "all other costs" category that includes both variable and fixed costs. Because variable and fixed store costs are allocated to the prescription department based on different factors, we had to separate out the portion of these costs that is variable from the portion that is fixed. To do so, we assumed that the "all other costs" category for independent pharmacies had the same ratio of fixed to variable costs in each volume category as did the chains. For chains, fixed costs ranged from 27 percent of total costs minus personnel costs, central administration and rent at low volumes, to 45 percent at high volumes. To facilitate comparisons between independent and chain pharmacies and to confirm our assumptions about the shape of the cost curves, these data are graphed in Figure 2.1. Mid-points of the volume categories are used for the chain pharmacies and the average prescription volumes per year are used for the independent pharmacies in this graph.

These data show that the average dispensing cost (ADC) declines for both chain and independent pharmacies with higher volume. The decline, however, is much more pronounced for chain pharmacies. In addition, at low prescription volumes, independent pharmacies are less costly to operate than chain pharmacies, but the opposite is true at medium to high volumes. The economies of scale for chain pharmacies do not begin until an annual volume of 28,000 prescriptions is reached

These data can be used to test the hypothesis that marginal costs for pharmacies are constant at prescription volumes observed in operating pharmacies in the relevant ranges. If we assume that plant and equipment need not be expanded to increase pharmacy output at the margin (which must be true for marginal costs to be constant), then we can define marginal costs as average variable costs (AVC). Average variable costs are the sum of employee wages and other variable costs. Average variable costs for chain pharmacies decline in the low volume ranges and level off around 50,000 prescriptions per year. Only one-third of chain pharmacies sell 50,000 or more prescriptions per year Thus, many chain pharmacies operate at a volume on the declining section of the marginal cost curve

Table 2.4
Chain Pharmacy Dispensing Costs Per Prescription by Prescription Volume, 1988

	PRESCRIPTIONS PER YEAR						
	Under 20,000	20,000-29,999	30,000-39,999	40,000-49,999	50,000-59,999	60,000-69,999	70,000+
(n)	(85)	(121)	(135)	(119)	(88)	(50)	(97)
Store personnel	$6.53	$4.35	$3.42	$3.26	$2.71	$2.80	$2.46
Other variable costs	0.35	0.34	0.26	0.30	0.29	0.25	0.25
Central administration	0.70	0.66	0.69	0.58	0.76	0.47	0.35
Rent	0.42	0.28	0.19	0.29	0.21	0.26	0.18
Other fixed costs	0.95	0.52	0.43	0.38	0.34	0.33	0.31
Average dispensing costs	$8.95	$6.15	$4.99	$4.81	$4.31	$4.11	$3.55
Average variable costs	$6.88	$4.69	$3.68	$3.56	$3.00	$3.05	$2.71

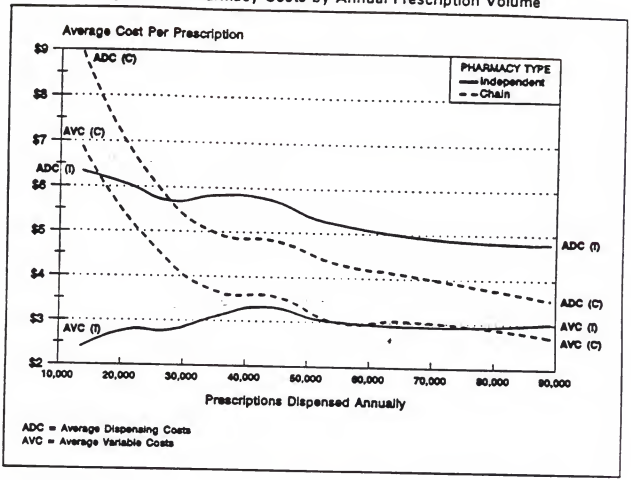
Source: Appendix tables. K.W. Schafermeyer, S.W. Schondelmeyer and J. Thomas. *Final Report: An Assessment of Chain Pharmacies' Costs of Dispensing a Third Party Prescription.* Prepared for the National Association of Chain Drug Stores, 1990.

Table 2.5
Independent Pharmacy Per Prescription Dispensing Costs by Prescription Volume, 1988

	PRESCRIPTIONS PER DAY (AVERAGE PER YEAR)						
	<60 (13,595)	60-75 (21,162)	76-100 (27,551)	101-125 (34,884)	126-150 (42,717)	151-200 (52,857)	200+ (89,180)
(n)	(445)	(265)	(338)	(235)	(148)	(160)	(111)
Employee wages	$1.90	$2.04	$2.11	$2.32	$2.53	$2.35	$2.37
Other variable costs	0.49	0.74	0.67	0.76	0.80	0.69	0.65
Proprietor salary	2.31	1.84	1.56	1.52	1.28	1.13	0.82
Rent	0.31	0.27	0.26	0.25	0.25	0.20	0.17
Other fixed costs	1.33	1.14	1.11	0.97	0.93	0.91	0.79
Average dispensing costs	$6.34	$6.03	$5.71	$5.82	$5.79	$5.28	$4.80
Average variable costs	$2.39	$2.78	$2.78	$3.08	$3.33	$3.04	$3.02

Source: Table 4. *1989 Lilly Digest.* (Indianapolis, IN: Eli Lilly and Company, 1989.)

Figure 2.1 Pharmacy Costs by Annual Prescription Volume



Source: Tables 2.4 and 2.5

On the other hand, average variable costs for independent pharmacies are approximately constant with prescription volumes of 20,000 or more. In fact, as many as 40 percent of independent pharmacies appear to operate at volumes on an increasing section of their marginal cost curve (i.e., at volumes less than 30,000 prescriptions per year). This phenomenon is due to the fact that at low prescription volumes, the pharmacist-proprietor provides the bulk of the labor and, as noted, proprietors' wages are considered fixed costs. At higher prescription volumes, the marginal costs for independent and chain pharmacies are approximately equal.

2.4.3 State Variation in Pharmacy Dispensing Costs

Estimating State-level dispensing costs was problematic since direct data on dispensing costs were obtained from only 20 States in the National BioSystems survey and two additional States, Rhode Island and North Carolina, from more recent surveys (Schafermeyer and Cataldo, 1992; Kilpatrick et al., 1992). The best method to derive dispensing costs would be to use a probability sample of pharmacies in each State and a national survey instrument to assure consistency and statistical reliability. Such data do not exist. However, survey data for 20 States were available from National BioSystems, with completion dates ranging from the early 1980's to 1991. Since the remaining data used in this study were for the 1990-91 time period, the results from the National BioSystems surveys needed to be updated. The updating was done by adjusting the survey data by the change in the Consumer Price Index (CPI) for prescriptions between the year of the State's survey and 1991. We assumed that dispensing costs moved with overall inflation in prescription prices. The Rhode Island data were updated in a similar fashion. The North Carolina survey was done on 1991 data, so it needed no adjustment. The average of the dispensing costs as estimated by these surveys was $6.16, which is quite comparable to an estimate derived by weighting the dispensing cost estimates for chains and independents (1988 values reported in Table 2.3) by their proportion of community pharmacies; this weighted value was also updated to 1991 by the 6 percent annual growth rate implied in Table 2.3. This estimate equaled $6.08.

The main body of this report uses an estimate of State-level dispensing costs based on the $6.08 national average and an index developed for measuring physician practice costs across geographic areas (Zuckerman et al., 1990). The physician cost index was weighted by a State's population in urban/rural areas to derive a State-wide value. This State-level index was then simply multiplied by the $6.08 value to derive State estimates of dispensing costs. The advantage of using the physician index is that: 1) it is derived in the same fashion for each State; and 2) it uses estimates of input cost variation across States that are likely correlated with the costs of pharmacy operations. That is, factors causing physicians hourly rates (e.g. general costs-of-living) and overhead costs (e.g. rents) to be high in one area of the country are likely to cause pharmacy salaries and overhead to also be high.

Other estimates of dispensing costs were derived for comparison. For example, the wage and capital cost indices used in the Prospective Payment System for 1991 (Commerce Clearing House Medicare and Medicaid Guide, No. 712, September 10, 1992) were used in a similar manner to derive dispensing cost estimates in each State. These values were in close agreement with the ones

described above, but neither of them was in close agreement with those reported by National BioSystems. We note, however, that many of the State-specific surveys provided by National BioSystems did not seem to be reasonable measures of variation in wage levels across the country; e.g., areas with low costs of living (and vice versa) reported higher (and vice versa) dispensing costs. The estimate based on the physician cost indices was considered the most reliable and, as noted, used in the analysis.

2.4.4 Ingredient Costs

Ingredient costs are significant to the operation of any pharmacy in that they are largely beyond the control of the pharmacy and are a large component of total costs. As noted above, costs of goods (all goods) sold constitute approximately 70 percent of total costs. Thus, knowledge of the variation in ingredient costs across areas and pharmacy types is very important to the adequacy of State payment. This highlights a key issue—States' knowledge of the actual ingredient acquisition cost that pharmacies face is not generally available. As a consequence, States have begun to use one of two different methods to estimate these costs for reimbursement purposes (Kreling and Kirk, 1986). They either use AWP minus a selected percentage or WAC plus a percentage, or mark-up. The present study provides new information on estimated ingredient acquisition costs by region and State for the representative market basket of drug products.

The methods used to derive these ingredient cost estimates were briefly described in the methodological overview and are presented in more detail below.

2.4.4.1 State Data on Ingredient Costs

To move from the regional data to estimates of what drugs cost pharmacies in each State, additional regional-level data from IMS America were obtained on variations in costs to pharmacies. These ranges were only obtained for a small sample of drugs (both brand names and generics) due to resource and time constraints (see Appendix D for a listing of these products). In selecting these products, several factors were considered. We wanted diversity across brand and generic product groups, therapeutic categories, and manufacturers, since this would allow us to check for differences in price distribution behaviors across these variables. *A priori* we surmised that there would be greater variability in the purchase price distributions within the generic products compared to the distributions within the brand name manufacturers' products.

2.4.4.2 State Estimates of Ingredient Costs

We would also expect to observe variation in the per-unit ingredient costs across the size (or type) of pharmacy. Unfortunately, these data are not available from IMS America. In the absence of these data a decision was made to derive a weighted average price for each drug product using the price spread in each region and the following assumptions:

- Large chains at average IMS America unit cost * (1 - .5 * %Price Spread);
- Small chains and large independents at average IMS America unit cost; and
- Small independents at IMS America unit cost * (1 + .5 * %Price Spread).

The above assumptions rest on information from earlier studies regarding the price discounts that can be obtained when purchasing larger volumes (Kreling, 1991; Kreling and Kirk, 1986; Gagnon and Rodowskas, 1974) and knowledge of the relative prescription volumes that independents and chains supply. Recall that large pharmacies are defined in the IMS data as those with more than $45,308 per month. This applies to both chains and independents.

We assume chain pharmacies with high prescription volumes ("large chains") would obtain the best prices from suppliers (wholesalers) by virtue of their purchase volumes, both as individual stores, and with the combined buying power from all units of the chain in aggregate, plus they accomplish economies through their own warehousing operations. Independent pharmacies with large prescription volumes and small volume chain pharmacies were grouped together as a middle, average costs group. Although chains with small prescription volumes may obtain economies through their own warehousing operations, their costs for items not available from their warehouse, or from a secondary wholesaler, would be higher than other pharmacies. In total, their purchases would reflect what might be typical for an independent pharmacy that was a "going concern" and prosperous, thus representing the "norm" in a wholesaler's purchase mix. Independents with low prescription volumes would have the least ability to obtain favorable purchasing terms and thus would have the highest purchase costs.

The three values derived above were weighted by the total number of prescriptions supplied by each of these pharmacy types. The full formula used is shown below:

$$C^{*}_{is} = \left(\sum_{j=1}^{n} C_{ijs} * W_{js}\right) / \sum_{j} W_{js}$$

where:

C^*_{is}	=	estimated average ingredient cost of the i^{th} drug product in each State (s)
C_{ir}	=	per-unit cost for i^{th} drug product in region (R) assigned to the j^{th} pharmacy size and type category for State(s) in region (R)
i	=	1 .....n drug products in the market basket
R	=	region
j	=	pharmacy size and type category
W_{js}	=	number of prescriptions of pharmacies in j^{th} size and type category (above) in State

The data on the number of prescriptions provided by each pharmacy type were derived as noted earlier, from the IMS America Prescription Drug File. The effect of the above weighting depended upon how much variation in pharmacy size and volume there was across States within a region. To the extent this reflected State-level detail about the pharmaceutical industry, this made the ingredient cost estimates more relevant to specific States.

The next step in deriving an estimate of the ingredient costs in each State involved moving the above estimate to the prescription level. To do this, the State measure of per-unit (e.g., per-tablet) ingredient cost was multiplied by the most common prescription size dispensed to Medicaid enrollees. As noted, Tape-to-Tape data are used to derive the average product sizes; methods specific to this adjustment are explained in more detail in the section on payment simulations.

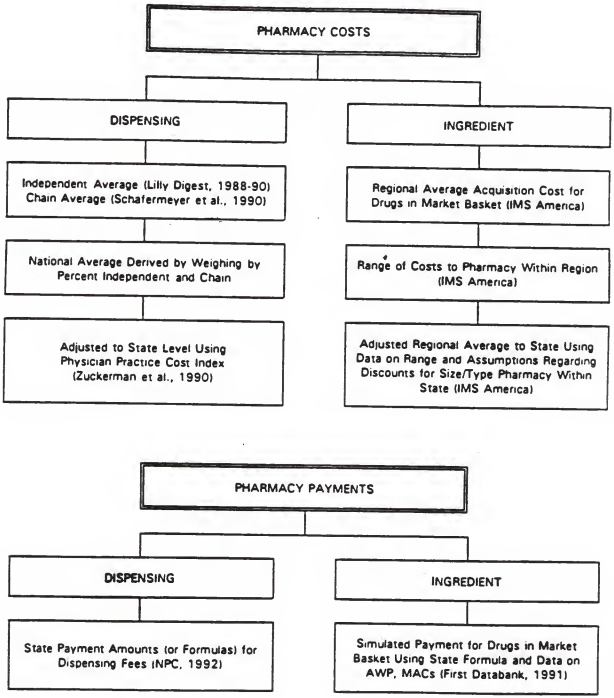
Finally, to derive the data shown later in Table 3.1, the average prescription ingredient costs were weighted by the relative proportion of total volume that each drug represented in the overall market basket.

2.5 METHODS FOR MEASURING ADEQUACY

The method for measuring the adequacy of State payment involved comparing the estimates of ingredient and dispensing costs described in the forgoing section to simulated State Medicaid payments for the same set of drugs, or those in the market basket. The difference between these payment and cost measures form the basis of the adequacy measure. A diagram of all steps involved is provided in Figure 2.2. As this illustrates, the dispensing and ingredient components for both costs and payments were first derived separately. We have previously described the methods used to estimate the cost components. Next, we briefly discuss methods used to derive estimates of State payments for the ingredient and dispensing components. Details are included in Appendix E.

Figure 2.2

Chart of Data and Methods for Deriving Pharmacy Costs and Payments for Adequacy Measures



2.5.1 State Payment

States primarily reimburse on the basis of EAC plus a dispensing fee. Most States derive their estimates of acquisition costs on the basis of "published AWP" minus a specific percentage; four States used WAC plus a mark-up in 1991 (NPC, 1992). Moreover, it is generally accepted that AWPs overstate the actual purchase costs of products among pharmacies. How much they overstate them, however, is unknown. Accurate estimation of these costs are critical since they constitute such a large portion of the total dollar paid for prescription drugs dispensed. Yet, as noted, data are not readily available to accurately estimate these costs for individual drug products within each State.

To provide one measure of the adequacy of payment for prescription drugs in each State, this study combined the forgoing data on EAC with simulated State payments. While a simulation of State payment can provide significant insight, we were not able to incorporate every detail that would affect these payments. However, most of the major aspects of payment policy for ingredient costs were accounted for. In particular, the simulation:

- Reflected the State's basic formula used for ingredient costs;
- Incorporated Federal upper limits or State MACs where appropriate;
- Reflected polices on limits on number and size of prescriptions;
- Reflected policies on mandatory substitution of generic products; and
- Incorporated average prescription size and volume weights based on data specific to the Medicaid population.

The first step in deriving the State payment for ingredients used the State's formula for ingredient costs in conjunction with Federal/State upper limits, or MACs, to derive a dollar amount per drug. This was then multiplied by the average size of prescriptions for this drug, as dispensed to Medicaid enrollees. The result of this calculation was then combined with the amount paid for dispensing costs. Most States simply pay a flat fee for estimated dispensing costs (NPC, 1992). The total (ingredient plus dispensing) represented the amount each State paid for each type of prescription in the market basket. To obtain a summary measure for the whole market basket, these values were then multiplied by the weights used earlier in deriving the summary measure of ingredient costs. While these methods give a reasonably accurate measure of Medicaid payments, they do not account for the fact that States pay the lower of estimated cost and a pharmacy's usual and customary charge. Hence they may be biased upward.

2.6 METHODS FOR MEASURING ACCESS

Ideal measures of access were not available. For this report access was measured using two main indicators: 1) the percentage of pharmacies participating in Medicaid; and 2) the number of prescriptions per enrollee. The major steps and data sources used are shown in Figure 2.3. The number of participating pharmacies was measured at two cut-offs. A pharmacy was counted as participating if: 1) the pharmacy submitted even one claim during the month of December 1991; and 2) if the pharmacy's Medicaid prescriptions account for five percent or more of its total volume. Data from a sample of pharmacies maintained by IMS America were used in deriving the number of participating pharmacies.

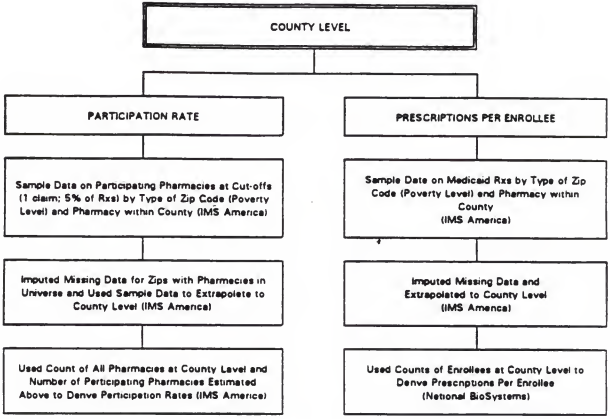
Theoretically, measures of access might also include information as to whether enrollees have been refused services at a pharmacy from which services were sought and the distance enrollees must travel to obtain pharmaceutical services. This level of detail was not available for this study. However, additional insight on access was gained by examining the participation rates of pharmacies by type (large and small chains and independents) and using additional information provided by IMS America on the location of pharmacies by level of poverty within each county area.

These measures were derived from the IMS America data, which were provided for one month (December 1991) by zip code (within county) level of poverty, pharmacy volume and pharmacy type (chain versus independent). The month of December was used to derive the basic counts for the sample, which were then annualized and extrapolated to the population level. A special program in BMDP Statistical Software™ was used to analyze patterns of missing data before the extrapolation process. These were used to guide the specification of the regression (variables missing at random are most appropriate) which was used to impute missing values for those zip code areas which contain pharmacies in the universe but for which there was no sample pharmacy. Sample weights were used in the regression and to extrapolate sample values to the population at the State and county level. This adjusts for the sampling rates (of chains versus independents) inherent in the IMS America data.

Several recent studies have noted the pitfalls inherent in using a participation rate alone as a measure of access. If participating providers are located in areas where few Medicaid enrollees live, their effect on improving overall access to services may be overstated. That is, if enrollees are residentially segregated in inner city areas, the willingness of pharmacies located in suburban areas to participate has little meaning and may, indeed, explain why some providers participate at such low levels (Fossett et al., 1990; Fossett and Peterson, 1989). The actual impact of policies such as raising

Figure 2.3

Chart of Data and Methods for Deriving Access Measures at State and County Level



payment rates may be less effective than expected if enrollees are not located in the areas where decisions by pharmacies to newly participate in Medicaid take place. In short, for analysis of access, the demand for Medicaid services as exhibited by the presence, and perhaps concentration, of enrollees in certain geographic areas should be accounted for. Although this study could not look in great detail at the issue of residential segregation and access, measures of pharmacy participation were broken out into:

- Overall participation rates in high poverty areas;
- Chain pharmacy participation rates in high poverty areas; and
- Independent pharmacy participation rates in high poverty areas.

These participation rates were examined in conjunction with information on the location of pharmacies (and chains versus independents) in the high versus low poverty areas.

Ultimately, providers' decisions to participate in Medicaid were expected to be reflected in the utilization. Additional measures of access included in this analysis shift the focus to the enrollee:

- Number of participating pharmacies per enrollee; and
- Number of prescriptions per enrollee.

These measures begin to relate the supply and demand sides of the equation. If greater participation does indeed occur in areas where enrollees tend to live, there will be a greater effect on the above enrollee-based measures. These were examined at both the State and county level.

2.7 MULTIVARIATE ANALYSIS

One of the primary reasons for considering the adequacy of payment policy is to gauge its relationship to enrollee access to pharmaceutical services. One way to do that is to derive hypotheses about this relationship and test them using regression analyses. In this section, the hypotheses and an outline of the regression analyses relating measures of adequacy to access are presented.

An economic model of the supply and demand for Medicaid pharmaceutical services is presented in Appendix C. In this model, pharmacies are assumed to face a declining average cost curve and a flat marginal cost curve. With this assumption, Medicaid participation is shown to result in greater profits for pharmacies, even if payments are below average cost but at least as high as marginal costs. Once payment levels fall below marginal costs the model predicts dramatic declines in program participation among pharmacies. From this model, we derived the following hypotheses

- Medicaid may be able to pay below average costs given its overall market power, but it may be constrained from doing so. This may be particularly true in areas with significant numbers of HMO enrollees if these HMOs obtain discounts from the usual private charges of pharmacies and thereby lower profit margins.

- Because marginal costs appear to be about 75 percent of average dispensing costs at profitable output levels, Medicaid probably cannot set prices below 75 percent of average total costs without impairing access (this argument may be consistent with more than 25 percent difference between prices in the private sector and the Medicaid reimbursement level, however, if pharmacies charge more than their average costs to private payors).

- The apparent cost advantage of large and medium sized pharmacies over small pharmacies suggests that small pharmacies may not participate at reimbursement rates at which larger ones will (holding all other factors constant); if marginal costs are close for small and large pharmacies and if private demand within the area is lower, smaller pharmacies may still choose to participate.

- Medicaid may be able to pay at lower rates only to a threshold point (e.g marginal cost); below this point, there is likely to be significantly lower participation.

Some of these hypotheses can be examined more directly than others, given the data. To do so, we present a series of multivariate models. First, we present State-level models of participation and prescriptions per enrollee. These are followed by county-level models of participation and prescriptions per enrollee. Estimated models are presented for both the State and county levels because, given limitations of the data, the two sets of models reveal different features of the relationship between adequacy and access. In both the State and county-level models we test only the less restrictive measure of participation, those submitting at least one Medicaid claim.

The State level models enable the relationship between adequacy and access to be tested directly. However, the power of the statistical analysis is reduced by the limited variation in the State adequacy variable, coupled with the small sample size inherent in State-level analyses. In contrast,

the county-level models provide much more variability in the data—enhancing the ability to identify statistically significant relationships between the explanatory variables and the outcome measures. In addition, the county-level analysis is much more akin to local markets. However, there are problems with the county-level analyses as well. Perhaps most importantly, no direct measure of adequacy exists at the county level. As a consequence, inferences about the relationship between adequacy and access must be based on indirect measures of adequacy.

III. STUDY FINDINGS

3.1 FINDINGS

The major findings of this study are reported in this chapter. They follow the methodology as described in detail in Chapter II. These findings relate to the: 1) estimates of State-level ingredient and dispensing costs; 2) adequacy of State payment; 3) State variation in access; and 4) multivariate analyses. Results for all States (except Arizona) and the District of Columbia are presented in the tables contained in this chapter.

3.2 STATE-LEVEL AVERAGE COSTS

The methodology for deriving estimates of average ingredient and dispensing costs for the pharmacies in each State was described in Chapter II. As discussed there, the key data for deriving the ingredient costs were the per-unit cost data at the regional level, as provided by IMS America. From the raw IMS America data, it is apparent that per-unit purchasing costs vary only slightly by region of the country; the average difference in the per-unit costs across regions for the fifty drugs with the highest volume of transactions (during the fourth quarter of 1991) was only 0.3 percent. However, these differences are compounded when total prescription costs (i.e., weighted by product size) are considered. The East South Central and Mountain regions tended to exhibit the lowest per-unit costs, based on a sample of fifty drugs. These data indicated that a fair amount of variation existed in the prices at which products were sold, with more variation occurring for generic products, as expected.

The within-region spreads varied from three to five percent for brand products and from one to nine percent for generic products. When averaged across these drug products, the spread within each region ranged from three to five percent. There appeared to be less variation in the West South Central and Mountain States than in other regions, especially the New England States where the average price spread was around five percent. As discussed in Chapter II, these regional values were weighted by the volume of prescriptions sold by large/small chains and independents in each State and average prescription size.

The State values shown in column one of Table 3.1 reflect the final weighting used: the relative importance of each prescription in the market basket of drugs. The average dollar value paid across the set of market baskets for all States was $18.33. As the data in Table 3.1 show, there is little variation around this average in terms of what States' pharmacies must pay. Most of the States' and regions' pharmacies pay between 95 and 100 percent of this average value. There does appear to be a tendency for higher costs to be experienced by pharmacies operating in the following States: Oklahoma, Texas, California and South Carolina. These differences may reflect differences in the wholesalers in each region, the mix of pharmacy types in each State, and/or factors affecting the mix of drugs and prescription size dispensed in each State.

The dispensing cost estimates derived as described earlier (see page 26) are shown in the second column of Table 3.1 for each State. The national average is $5.55 and ranges from a low of $4.87 in Arkansas to $8.23 in Alaska.

Taken together, the cost estimates shown in Table 3.1 indicate that the dispensing of the typical market basket of Medicaid prescriptions costs the Nation's pharmacies around $24. There is significant variation around this average total cost value across the States. In the next section we begin to consider the adequacy of State payments in relation to these estimated costs.

3.3 RESULTS ON ADEQUACY OF STATE PAYMENT

3.3.1 Overall Adequacy

Results on the estimates of overall payment adequacy are shown in Tables 3.2 through 3.4. Some results are also summarized in a map of the Nation (Figure 3.1). The map gives a quick view of the geographic patterns of payment adequacy as measured by the data and methods used here. In general, States appear to pay adequately for pharmacy services, although many fall slightly below the estimates of cost, before profits. The (unweighted) average payment to cost ratio for the Nation, as estimated here, equals 96 percent. This estimated ratio varies somewhat across the States as shown in Figure 3.1 and column 1 of Table 3.2. As Figure 3.1 illustrates, the 12 States paying more than adequately, or 100 percent (and over) of the estimated costs, are distributed throughout the country. The Pacific and West South Central regions have the greatest representation of States with payment adequacy greater than or equal to one

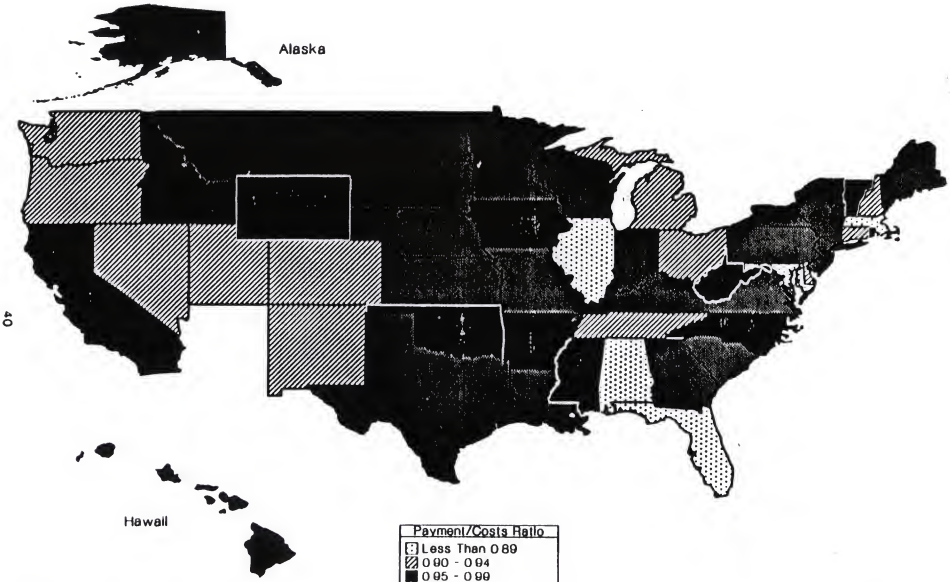
Table 3.1
Weighted State Estimates of Ingredient Costs Per Prescription for Drugs in the Market Basket and Estimated Dispensing Costs, by State, 1991

STATE	WEIGHTED AVERAGE INGREDIENT COSTS	ESTIMATED DISPENSING COSTS
U.S. AVERAGE	$18.33	$5.55
NEW ENGLAND STATES		
Connecticut	17.90	8.51
Maine	17.81	5.08
Massachusetts	18.14	5.97
New Hampshire	17.86	5.50
Rhode Island	17.88	6.08
Vermont	18.05	5.00
MIDDLE ATLANTIC STATES		
New Jersey	17.90	6.85
New York	17.95	5.99
Pennsylvania	17.82	5.65
EAST NORTH CENTRAL STATES		
Illinois	17.49	5.89
Indiana	17.45	5.38
Michigan	17.10	5.93
Ohio	17.49	5.55
Wisconsin	17.54	5.32
WEST NORTH CENTRAL STATES		
Iowa	17.93	5.22
Kansas	17.87	4.95
Minnesota	17.91	5.48
Missouri	17.77	5.10
Nebraska	17.48	4.89
North Dakota	17.98	5.18
South Dakota	17.93	4.88
SOUTH ATLANTIC STATES		
Delaware	17.29	5.98
District of Columbia	17.68	N/A
Florida	17.43	5.48

Table 3 (Continued)
Weighted State Estimates of Ingredient Costs Per Prescription for Drugs in the Market Basket and Estimated Dispensing Costs, by State, 1991

STATE	WEIGHTED AVERAGE INGREDIENT COSTS	ESTIMATED DISPENSING COSTS
Georgia	17.50	5.07
Maryland	17.53	6.08
North Carolina	17.32	5.01
South Carolina	21.34	5.11
Virginia	17.35	5.28
West Virginia	17.24	5.22
EAST SOUTH CENTRAL STATES		
Alabama	18.07	5.30
Kentucky	17.82	5.26
Mississippi	17.95	5.03
Tennessee	17.84	5.07
WEST SOUTH CENTRAL STATES		
Arkansas	18.19	4.87
Louisiana	18.08	5.34
Oklahoma	23.29	5.12
Texas	22.18	5.08
MOUNTAIN STATES		
Colorado	18.05	5.41
Idaho	18.10	5.38
Montana	18.20	5.30
Nevada	17.99	6.08
New Mexico	18.08	5.47
Utah	18.03	5.75
Wyoming	18.14	5.49
PACIFIC STATES		
Alaska	18.88	8.23
California	27.41	8.42
Hawaii	18.70	8.82
Oregon	18.50	5.88
Washington	17.02	5.94

Figure 3.1 Adequacy of Overall Payment



Source: IMS, America and First Databank

Note: Arizona data omitted

Table 3.2
Adequacy of Payment, Overall and by Component of Cost, by State, 1991

STATE	RATIO OF ESTIMATED PAYMENTS TO COSTS			
	Overall Payment/Costs	Ingredient Payment/Costs	Dispensing Payment/Costs	Overall Payment Adequacy Index*
U.S. AVERAGE	.96	1.02	.79	1.00
NEW ENGLAND STATES				
Connecticut	.93	1.03	.68	.96
Maine	.97	1.07	.86	1.01
Massachusetts	.83	.88	.68	.88
New Hampshire	.92	1.01	.84	.95
Rhode Island	1.01	1.16	.58	1.05
Vermont	1.00	1.05	.85	1.04
MIDDLE ATLANTIC STATES				
New Jersey	.96	1.09	.61	1.00
New York	.99	1.17	.43	1.02
Pennsylvania	.99	1.11	.62	1.03
EAST NORTH CENTRAL STATES				
Illinois	.88	.95	.68	.92
Indiana	.98	1.06	.74	1.02
Michigan	.90	1.00	.63	.94
Ohio	.90	1.01	.58	.94
Wisconsin	.97	1.01	.88	1.01
WEST NORTH CENTRAL STATES				
Iowa	1.04	1.05	1.00	1.08
Kansas	.99	.98	1.02	1.03
Minnesota	.97	1.05	.75	1.01
Missouri	.96	1.00	.80	.99
Nebraska	.98	1.00	.90	1.02
North Dakota	.96	1.00	.82	.99
South Dakota	.99	1.00	.97	1.03
SOUTH ATLANTIC STATES				
Delaware	.93	1.05	.61	.97
District of Columbia	.97	1.02	.79	1.01
Florida	.84	.87	.77	.88

* Each state payment ratio is indexed to the national average value for this index.

Table 3.2 (Continued)
Adequacy of Payment, Overall and by Component of Cost, by State, 1991

STATE	RATIO OF ESTIMATED PAYMENTS TO COSTS			
	Overall Payment/Costs	Ingredient Payment/Costs	Dispensing Payment/Costs	Overall Payment Adequacy Index*
Georgia	.99	1.02	.87	1.02
Maryland	.84	.84	.83	.87
North Carolina	1.08	1.05	1.12	1.10
South Carolina	.97	1.01	.79	1.01
Virginia	.98	1.02	.83	1.02
West Virginia	1.01	1.16	.53	1.05
EAST SOUTH CENTRAL STATES				
Alabama	.87	.83	1.02	.91
Kentucky	.97	.99	.90	1.01
Mississippi	1.02	1.03	1.03	1.08
Tennessee	.94	.99	.77	.97
WEST SOUTH CENTRAL STATES				
Arkansas	1.08	1.00	1.15	1.10
Louisiana	.96	.97	.94	1.00
Oklahoma	1.00	1.00	.99	1.04
Texas	.96	.97	1.01	1.02
MOUNTAIN STATES				
Colorado	.94	1.00	.75	.97
Idaho	1.03	1.10	.80	1.07
Montana	.96	1.04	.76	1.01
Nevada	.93	1.00	.73	.97
New Mexico	.93	.99	.73	.97
Utah	.92	.96	.75	.96
Wyoming	1.01	1.06	.86	1.05
PACIFIC STATES				
Alaska	1.05	1.10	.95	1.09
California	1.02	1.11	.83	1.05
Hawaii	.95	1.06	.71	.99
Oregon	.94	1.04	.86	.96
Washington	.90	1.00	.83	.93

* Each state payment ratio is indexed to the national average value for this index

The bulk of the States, 20, plus the District of Columbia, fall into the 95-99 percent range. Pharmacy payments in these States are less than five percent off in terms of covering the average cost of dispensing drug products, given the estimates made in this study. Note, however, that these costs do not include a net profit and hence, ratios less than one mean that the pharmacies are receiving payments that, on average, do not cover their costs when dispensing Medicaid prescriptions even with profits excluded. This does not mean, however, that the pharmacy is not generating a profit over all payers, since the model (Appendix C) assumes they can charge more than average costs for non-Medicaid prescriptions.

States that pay 90-94 percent of estimated costs appear to be clustered in the Mountain region, but are also found in other regions of the country. The five States that pay less than 89 percent of estimated costs are also well distributed across regions, with the exception that two of the five are located in the south. As discussed in our theoretical section (Appendix C), we would expect pharmacies to participate even if average costs are not covered, as long as marginal costs are. Furthermore, from the national cost data available for chains and independents, marginal costs of dispensing may be as low as 75-80 percent for the typical pharmacy. Importantly, we found no State whose payment is below 80 percent in their overall (ingredient plus dispensing) payment adequacy. Thus, while the payment levels in most States are less than average costs, they appear sufficient to induce participation for the typical pharmacy in all States since they are above marginal costs.

The last column in Table 3.2 is an index of the relative generosity of each State's payment for both components. That is, given that on average States pay four percent below estimated costs, how does each State's adequacy rank in relation to that? Measured in this fashion, the Middle Atlantic States and the West South Central States are all at or above average, as are all but two of the States in the West North Central region of the country.

3.3.2 Ingredient Payment Adequacy

Another way of looking at the adequacy of payment is at the component level. That is, a State may be paying adequately for the dispensing costs but may be inadequate in its estimates of, and payment for, the acquisition costs of drugs. By examining each component separately, these issues can be highlighted.

Data in Table 3.2 include information on the separate components of the payment formula. The estimated adequacy of payment for ingredient costs is above 100 percent for the majority of

States; only 12 of the States have ratios less than 100 percent and seven of these are within three percent (ratios equal 97-99 percent) of the cost estimates. Given the data limitations and our need to estimate costs at the State level, payments may actually equal, or even exceed, average costs in some of these States. There are, however, four States that pay less than 90 percent of estimated ingredient costs for the market basket of drugs frequently dispensed to Medicaid enrollees in their State. Two of these States have ratios of only 83-84 percent of these estimated costs. If these ratios are off by several percentage points, payment in these States may be approaching marginal costs.

3.3.3 Dispensing Fee Payment Adequacy

The second component of payment adequacy relates to the difference between payment and estimated average costs for dispensing. These costs, as noted, include labor and overhead and the total dispensing fee includes profit. The labor and overhead costs are also difficult for a State to estimate accurately on a timely basis. The adequacy of payments for this component is also derived by taking the ratio of estimated State payments to costs and the results are presented in Table 3.2.

The results on the adequacy of payment for dispensing costs are uniformly consistent; States do not pay as well for this component. The national average ratio is 77 percent, as reflected in the data in Table 3.2. There are only seven States in which the payment for dispensing costs is estimated to be equal to or greater than average costs: Iowa, Kansas, North Carolina, Alabama, Mississippi, Arkansas, and Texas. There is some tendency for States in the New England and Middle Atlantic regions to pay less adequately than States in other regions; their average ratio equals 64 percent, while for the remaining regions, the average payment to cost ratio equals 83 percent. The opposite holds in terms of the relative adequacy in paying for ingredient costs; the New England and Middle Atlantic States average 1.06 on this measure, while the remaining States average 1.00. This relates to the patterns seen in the basis of payment used in each State—States that pay relatively more for ingredient costs tend to pay relatively less for dispensing fees in their overall formulae for payment. As noted, however, given the complexity of our methods for estimating ingredient costs and payments, these ratios may be off by a few percentage points.

3.3.4 Other Measures of Adequacy

Another way to measure the adequacy of payment is in actual dollar terms. The data in Table 3.3 illustrate the average dollar impact per prescription. These are simply the difference in weighted payments and costs for the market basket of drugs. These dollar amounts are only estimates and, as

Table 3.3
Additional Measures of State Payment, by State, 1991

State	Average Dollar Difference Between Costs and Payment Per Prescription	Index of Costs of Delay
U.S. Average	-.90	1.00
NEW ENGLAND STATES		
Connecticut	-1.77	.45
Maine	-.61	1.46
Massachusetts	-4.15	1.79
New Hampshire	-1.95	.42
Rhode Island	+ .22	5.00
Vermont	.00	.68
MIDDLE ATLANTIC STATES		
New Jersey	-1.02	1.32
New York	-.34	1.13
Pennsylvania	-.27	.60
EAST NORTH CENTRAL STATES		
Illinois	-2.69	4.04
Indiana	-.43	.73
Michigan	-2.27	.86
Ohio	-2.26	3.01
Wisconsin	-.60	.15
WEST NORTH CENTRAL STATES		
Iowa	+ .95	.50
Kansas	-.20	.12
Minnesota	-.59	.25
Missouri	-1.01	.20
Nebraska	-.50	.40
North Dakota	-1.00	1.04
South Dakota	-.26	.40
SOUTH ATLANTIC STATES		
Delaware	-1.47	.84
District of Columbia	-.80	N/A
Florida	3.56	.82
Georgia	.32	1.08

Table 3.3 (Continued)
Additional Measures of State Payment, by State, 1991

State	Average Dollar Difference Between Costs and Payment Per Prescription	Index of Costs of Delay
Maryland	-3.85	.48
North Carolina	+1.37	.48
South Carolina	-.85	.80
Virginia	-.65	.35
West Virginia	+.30	3.39
EAST SOUTH CENTRAL STATES		
Alabama	-3.01	.68
Kentucky	-.75	.43
Mississippi	+.58	.77
Tennessee	-.48	N/A
WEST SOUTH CENTRAL STATES		
Arkansas	+1.43	.38
Louisiana	-.86	.56
Oklahoma	+.01	.49
Texas	-.46	1.48
MOUNTAIN STATES		
Colorado	-1.46	N/A
Idaho	+.87	.47
Montana	-.54	.83
Nevada	-1.73	N/A
New Mexico	-1.84	1.45
Utah	-1.82	.38
Wyoming	+.33	1.02
PACIFIC STATES		
Alaska	+1.32	.88
California	+.52	N/A
Hawaii	-1.09	N/A
Oregon	-1.30	N/A
Washington	-2.32	.60

such, are subject to error in either direction. They also do not include any differential in costs for prescriptions prepared under third party billing. A recent study of dispensing costs in North Carolina (Kilpatrick et al., 1992) concluded that third party prescriptions cost more than average and Medicaid slightly more than other third parties. Still, they provide some insight into the dollar magnitude of the difference between average costs and payments in pharmacies in each State as they dispense to Medicaid enrollees.

We also note that these dollar amounts are measured relative to the weighted average payment simulated for the market basket of drugs in each State. Thus, if one State dispenses somewhat higher priced drugs to its Medicaid enrollees, the same adequacy measure (the ratio of payment to cost as presented in Table 3.2) in two States will result in a higher dollar difference (shown in Table 3.3) in the State with a "higher priced" market basket. On average across the States, the difference between average costs and payments per prescription equals $.90, or almost a dollar per prescription. It is interesting to compare this dollar amount with that estimated in an earlier study of "cost shifting", or the tendency of pharmacies to shift unpaid costs to other third parties; this estimate was $1.55. (Hawkins and McKercher, 1982; Gaedke and Hawkins, 1980.)

The average dollar difference in payments/costs varies across the States. Indeed, in several States the estimates indicate that pharmacies have a positive Medicaid profit margin, or that payments exceed average costs; these include Rhode Island, North Carolina, Arkansas, Oklahoma, Alaska, West Virginia, Mississippi, Idaho, California, Iowa and Wyoming. On the other hand, there are several States in which the measures indicate that pharmacy payments fall short of average costs by more than $2.00 per prescription; these States include Massachusetts, Illinois, Michigan, Ohio, Florida, Maryland, Alabama, and Washington.

The discount factor used to account for delays in payment is discussed in detail in Appendix E. This factor is used to estimate discounted payment values for each State, based on the Market Basket State Payment and the average number of Medicaid prescriptions written in a year in each State. This discounted value is compared to the dollar value that would have been paid without discounting. For example, the average dollar price paid for Medicaid prescriptions in 1990 as reported by NPC ($17.85) discounted at the extreme value for delays in State payment (66 days) results in a payment difference of $.30 per prescription. This relates to a total discount, relative to being paid promptly, of approximately $8,400 for a pharmacy providing $500,000 in Medicaid claims. These values were calculated for each State (using average Medicaid prescription volume) and then indexed (relative to the national average) as shown in Table 3.3. This index is one measure examined in the

regression analysis to test whether differences in payment lags are a strong deterrent to pharmacy participation, holding other factors constant. A recent survey indicated that pharmacies are willing to accept a lag in payment of as much as 22 days in their "most favorable" reimbursement contracts (Szeinbach and Mason, 1990).

In Table 3.4, the three measures of adequacy have been repeated in order, for ready comparison to the basis of State payment (shown in the first two columns). Several States' basis of payment for dispensing costs vary by drug cost or type. For example, in Illinois the payment is $3.58 or 10% EAC when ingredient costs exceed $35.80. We simulated this dispensing fee separately for each drug in the market basket. The average is reported in Table 3.4 for Illinois and other States with formulae we could simulate; where we could not simulate the formula, we called the State and obtained an average amount paid. As noted earlier, it appears that States trade-off higher payments for ingredient costs with lower payments for dispensing fees. As shown in these columns, Rhode Island, Idaho, New York, Pennsylvania and West Virginia all pay relatively well on ingredient costs (AWP with no discount). Yet, all fall below average on the dispensing fee payment, and New York and West Virginia have the lowest payments of all States ($2.60 and $2.75). The last three columns contain the adequacy measures, and it is interesting to compare the methods of payment to these measures.

In those States where the discount from AWP is relatively low, the adequacy measure for ingredient costs is quite high, ranging from a ratio of 1.10 to 1.17. On the other hand, their adequacy with respect to dispensing fees is generally lower (with the exceptions of Idaho and Alaska) than other States, ranging from .43 in New York to .63 in California. Overall, the tendency to pay more for ingredients offsets the tendency to pay less for dispensing fees in three of these five States; the overall measure for Rhode Island, West Virginia and Idaho is greater than 1.0. In the remaining States it equals 99 percent.

Of those States whose formulae have the highest discounts from AWP (10.5 percent or more), half pay above average for dispensing fees. For seven of these 10 States, their overall measure of adequacy is less than one, ranging from 90 percent to 99 percent. Given that ingredient costs are a larger portion of the total payment per prescription, paying less adequately for them has more of an impact on overall payment adequacy than payment for dispensing fees. Finally, those States which pay on the basis of WAC (plus a mark-up) have the lowest overall measures of payment adequacy, ranging from 83 percent in Massachusetts to 87 percent in Alabama. We note that in two of these four States, however, payment for dispensing costs are also below average.

Table 3.4
State Basis for Payment and Measures of Payment Adequacy, Overall and by Component, 1991

STATE	BASIS OF STATE PAYMENT		PAYMENT ADEQUACY*		
	Ingredient Cost	Dispensing Fee	Ingredient Cost	Dispensing Fee	Overall
U.S. Average	——	$4.34	1.02	0.79	0.96
NEW ENGLAND STATES					
Connecticut	AWP-6%	4.10**	1.03	.68	.93
Maine	AWP-5%	3.35	1.07	.66	.97
Massachusetts	WAC + 10%	4.08	.68	.68	.83
New Hampshire	AWP-10%	3.50**	1.01	.64	.92
Rhode Island	AWP	3.40	1.16	.56	1.01
Vermont	AWP-10%	4.25	1.05	.85	1.00
MIDDLE ATLANTIC STATES					
New Jersey	AWP-6%***	4.04**	1.09	.61	.96
New York	AWP	2.80	1.17	.43	.99
Pennsylvania	AWP	3.50	1.11	.62	.99
EAST NORTH CENTRAL STATES					
Illinois	AWP-10%	3.58**	.95	.66	.88
Indiana	AWP-10%	4.00	1.08	.74	.98
Michigan	AWP-10%	3.72	1.00	.63	.90
Ohio	AWP-7%	3.23	1.01	.58	.90
Wisconsin	AWP-10%	4.89	1.01	.88	.97
WEST NORTH CENTRAL STATES					
Iowa	AWP-10%	5.24**	1.05	1.00	1.04
Kansas	AWP-10%	5.06**	.98	1.02	.99
Minnesota	AWP-10%	4.10	1.05	.75	.97
Missouri	AWP-10.43%	4.09	1.00	.80	.96
Nebraska	AWP-8.71%	4.38**	1.00	.90	.98
North Dakota	AWP-10%	4.25	1.00	.82	.96
South Dakota	AWP-10.5%	4.75	1.00	.97	.99
SOUTH ATLANTIC STATES					
Delaware	AWP-6%	3.85	1.05	.61	.93
District of Columbia	AWP-10%	4.50	1.02	.79	.97
Florida	WAC + 7%	4.23	.87	.77	.84
Georgia	AWP-10%	4.41	1.02	.87	.99

* Adequacy is measured as ratio of payments to costs.
** Average obtained from State or calculated from simulation
*** New Jersey pays up to 6% based on pharmacy specific data

Note: AWP = Average Wholesale Price
WAC = Wholesale Acquisition Cost

Table 3.4 (Continued)
State Basis for Payment and Measures of Payment Adequacy, Overall and by Component, 1991

STATE	BASIS OF STATE PAYMENT		PAYMENT ADEQUACY*		
	Ingredient Cost	Dispensing Fee	Ingredient Cost	Dispensing Fee	Overall
Maryland	WAC + 10%	5.01**	.84	.83	.84
North Carolina	AWP-10%	5.60	1.05	1.12	1.06
South Carolina	AWP-9.5%	4.05	1.01	.79	.97
Virginia	AWP-9%	4.40	1.02	.83	.98
West Virginia	AWP	2.75	1.16	.53	1.01
EAST SOUTH CENTRAL STATES					
Alabama	WAC + 9.2%	5.40	.83	1.02	.87
Kentucky	AWP-10%	4.75	.99	.90	.97
Mississippi	AWP-10%	5.16	1.03	1.03	1.02
Tennessee	AWP-8%	3.91	.99	.77	.94
WEST SOUTH CENTRAL STATES					
Arkansas	AWP-10.5%	5.98**	1.00	1.15	1.06
Louisiana	AWP-10.5%	5.00	.97	.94	.96
Oklahoma	AWP-10.5%	5.10	1.00	.99	1.00
Texas	AWP-10.49%	5.11**	.97	1.01	.98
MOUNTAIN STATES					
Colorado	AWP-10%	4.08	1.00	.75	.94
Idaho	AWP	4.30	1.10	.80	1.03
Montana	AWP-10%	4.05**	1.04	.76	.98
Nevada	AWP-10%	4.42	1.00	.73	.93
New Mexico	AWP-10.5%	4.00	.99	.73	.93
Utah	AWP-12%	4.30**	.98	.75	.92
Wyoming	AWP-11%	4.70	1.08	.86	1.01
PACIFIC STATES					
Alaska	AWP-5%	7.84**	1.10	.95	1.05
California	AWP-5%	4.05	1.11	.63	1.02
Hawaii	AWP-10.5%	4.67	1.06	.71	.95
Oregon	AWP-11%	3.77**	1.04	.66	.94
Washington	AWP-11%	3.72**	1.00	.63	.90

* Adequacy is measured as ratio of payments to costs
** Average obtained from State or calculated from simulation

Note: AWP = Average Wholesale Price
WAC = Wholesale Acquisition Cost

3.3.5 Other Policies Related to Adequacy of Payment and Access

In Table 3.5, several other key drug-related policy measures are presented for each State. These include: 1) the percentage of the market basket of drugs for which the State has a MAC in place; 2) whether there is a limit on the number of prescriptions or refills; 3) whether generic substitutions are mandated; and 4) whether the State has a copay requirement. In the last two columns, other, more general State policies of the States' Medicaid program are presented: 1) an index of the relative level of payments for physicians' services; and 2) whether the State has a medically needy program. One reason for examining these policies is to see if States that are liberal on one policy are perhaps less liberal on others.

Of the 12 States with payment adequacy measures greater than 100 percent, the majority have restrictive policies on three out of the four drug-related policies. Only Idaho and Alaska appear to have generally liberal drug-related policies. Idaho is also relatively generous in terms of physician payment, as measured by the index presented in Table 3.5. This index was derived in an earlier study (Holahan, 1991). It measures the level of Medicaid payments for selected services (deflated by State-level cost of producing physician services) in each State relative to a national average payment level. California, a State with a large number of Medicaid enrollees, pays well for drugs, but has restrictive policies in most other areas noted in the table. They do have liberal eligibility policies (e.g., medically needy and traditionally high income thresholds), however. It is difficult to draw any conclusion on the relationship of drug payment and other policies within the Medicaid program.

3.4 RESULTS ON ACCESS MEASURES

In this section we present results on the access measures related to participation. First, overall participation rates are discussed; we then discuss variation in these participation rates by size and type of pharmacy. The next sub-section provides a brief description of patterns in participation by the level of poverty (within the zip code). Finally, we present data on the number of participating pharmacies by enrollee, prescriptions per enrollee and drug recipients by Medicaid enrollment group.

Table 3.5
Other State Policies Affecting Access to Drug Products for Medicaid Enrollees, by State, 1991

STATE	DRUG-RELATED POLICIES				OTHER POLICIES	
	% Drugs Subject to MAC	Limit on Number of Rxs or Refills	Generic Substitution	Co-Pay	Index* of Physician Payment	Medically Needy Program
NEW ENGLAND STATES						
Connecticut	0.4%	Y	N	N	.95	Y
Maine	0	Y	N	Y	1.01	Y
Massachusetts	15.4%	Y	Y	Y	1.37	Y
New Hampshire	0	Y	N	Y	1.18	Y
Rhode Island	60.4%	Y	Y	N	N/A	Y
Vermont	61.1%	Y	Y	Y	1.13	Y
MIDDLE ATLANTIC STATES						
New Jersey	0	Y	Y	N	.50	Y
New York	0	Y	Y	N	.86	Y
Pennsylvania	45.2%	Y	N	Y	.54	Y
EAST NORTH CENTRAL STATES						
Illinois	91.0%	Y	N	N	.72	Y
Indiana	0	N	Y	N	1.22	N
Michigan	51.2%	N	N	Y	.55	Y
Ohio	73.2%	Y	N	N	.64	N
Wisconsin	54.0%	Y	N	Y	.87	Y
WEST NORTH CENTRAL STATES						
Iowa	47.5%	N	Y	Y	1.13	Y
Kansas	60.2%	N	N	Y	1.05	Y
Minnesota	54.7%	N	Y	N	1.01	Y
Missouri	54.7%	N	N	Y	.70	N
Nebraska	58.3%	N	N	N	1.13	Y
North Dakota	0	Y	N	N	.93	Y
South Dakota	0	N	N	Y	1.02	N
SOUTH ATLANTIC STATES						
Delaware	0	N	N	N	.66	N
District of Columbia	0	Y	N	Y	N/A	Y
Florida	46.8%	Y	N	Y	1.15	Y
Georgia	55.5%	Y	N	N	1.72	Y
Maryland	0	Y	N	Y	.93	Y

* Each State payment ratio is indexed to the national average value for this index.

Table 3.5 (Continued)
Other State Policies Affecting Access to Drug Products for Medicaid Enrollees, by State, 1991

STATE	DRUG-RELATED POLICIES				OTHER POLICIES	
	% Drugs Subject to MAC	Limit on Number of Fills or Refills	Generic-Substitution	Co-Pay	Index* of Physician Payment	Medically Needy Program
North Carolina	0	Y	Y	Y	1.22	Y
South Carolina	48.3%	Y	N	Y	1.08	Y
Virginia	63.3%	N	N	Y	1.28	Y
West Virginia	0	Y	Y	Y	.91	Y
EAST SOUTH CENTRAL STATES						
Alabama	50.4%	Y	N	Y	1.23	N
Kentucky	50.1%	Y	N	N	.99	Y
Mississippi	45.8%	Y	Y	Y	.84	N
Tennessee	68.9%	Y	N	N	1.07	Y
WEST SOUTH CENTRAL STATES						
Arkansas	53.6%	Y	N	Y	1.14	Y
Louisiana	68.6%	Y	N	N	1.14	Y
Oklahoma	49.1%	Y	N	N	1.10	Y
Texas	50.7%	Y	N	N	1.15	Y
MOUNTAIN STATES						
Colorado	62.1%	N	N	Y	1.07	N
Idaho	0	N	N	N	1.48	N
Montana	0	N	Y	Y	.96	Y
Nevada	0	Y	N	N	1.29	N
New Mexico	0	N	Y	N	.87	N
Utah	0	N	N	N	.84	Y
Wyoming	0	Y	Y	Y	1.15	N
PACIFIC STATES						
Alaska	0	N	Y	N	.97	N
California	50.5%	Y	Y	Y	.95	Y
Hawaii	0	N	Y	N	.84	Y
Oregon	44.7%	N	Y	N	1.10	Y
Washington	58.1%	Y	N	N	.89	Y

* Each State payment ratio is indexed to the national average value for the index.

3.4.1 Overall Participation Rates

The overall extent of pharmacy participation in Medicaid is shown in Table 3.6. When participation is based on the number of pharmacies submitting at least one claim, the rates are quite high in most States, averaging 86 percent. More important, the participation rate exceeds 90 percent in 23 States. In an additional 16 States, this overall participation rate is 80-90 percent. However, there are 10 States and the District of Columbia in which the participation of pharmacies is lower; three States and the District of Columbia have participation rates between 50-69 percent. Another two States actually have rates that fall below 50 percent of the total number of pharmacies in the State.

It is important in examining these rates to keep in mind that the presence of Medicaid enrollees in an area create the demand for Medicaid services. If there are relatively few enrollees (or none) living within the service area of a pharmacy, the lack of participation is more related to this lack of demand than the willingness of the pharmacy to supply services. Along this line, the States with the lower participation rates tend to be less populated western States. Thus, many pharmacies may face little or no Medicaid demand for their services in parts of these States.

Another aspect of the pattern of pharmacy participation is shown in Table 3.6. These data show participation rates separately for small versus large and chain versus independent pharmacies. Given the underlying model of pharmacy participation we would expect smaller pharmacies to be less willing to participate in Medicaid if payments are below average costs. In general we see this in the data; the national average participation rate (based on one claim) equals 85 percent for smaller pharmacies and 90 percent for larger ones. On average across the States, 93 percent of chain pharmacies participate (based on the submission of at least one claim); in 39 States the participation rate of chain pharmacies is between 90-100 percent. In five States and the District of Columbia, the participation rates of chains fall below 80 percent. On the other hand, independent pharmacies in the majority of States are less likely to participate in Medicaid (again based on one claim). The average participation rate for independents across the States averaged 82 percent and varied significantly across the States, as seen in Table 3.6. However, the participation of chains was higher based on one claim versus the higher cut-off, five percent of prescriptions (Table 3.7).

A different picture emerges with the data on the percentage of pharmacies whose Medicaid prescription volume represents five percent or more of their total. These data are shown in Table 3.7 and Figure 3.2. This rate may be more indicative of those pharmacies that are involved in servicing

Table 3.6
Participation Rate (Based on One or More Claim) Overall, by Size and Type of Pharmacy, by State, 1991

STATE	SIZE		TYPE		TOTAL
	< $45,308 Per Month	≥ $45,308 Per Month	Chain	Independent	
U.S. AVERAGE	85%	90%	93%	82%	86%
NEW ENGLAND STATES					
Connecticut	93.64%	96.77%	99.08%	92.36%	94.85%
Maine	86.93%	89.54%	100.00%	86.77%	87.88%
Massachusetts	91.60%	96.87%	100.00%	88.16%	93.61%
New Hampshire	89.68%	81.84%	89.20%	84.48%	86.82%
Rhode Island	100.00%	73.70%	82.87%	93.33%	88.25%
Vermont	100.00%	100.00%	100.00%	100.00%	100.00%
MIDDLE ATLANTIC STATES					
New Jersey	85.15%	93.01%	100.00%	81.41%	88.16%
New York	85.47%	93.71%	99.07%	83.36%	87.91%
Pennsylvania	87.09%	93.09%	98.64%	81.73%	89.18%
EAST NORTH CENTRAL STATES					
Illinois	81.88%	94.35%	98.23%	78.26%	85.90%
Indiana	99.27%	99.51%	98.96%	100.00%	99.36%
Michigan	89.51%	90.47%	97.17%	84.87%	89.91%
Ohio	86.64%	94.21%	98.69%	78.01%	89.39%
Wisconsin	87.27%	78.79%	77.80%	88.13%	84.78%
WEST NORTH CENTRAL STATES					
Iowa	94.86%	99.41%	98.90%	94.63%	95.87%
Kansas	88.65%	88.22%	94.19%	85.53%	88.54%
Minnesota	90.74%	98.70%	95.08%	91.11%	92.39%
Missouri	91.86%	94.30%	98.90%	88.32%	92.71%
Nebraska	85.40%	100.00%	98.53%	83.71%	88.11%
North Dakota	92.38%	98.69%	100.00%	92.28%	93.11%
South Dakota	57.80%	82.66%	81.12%	55.34%	61.22%
SOUTH ATLANTIC STATES					
Delaware	98.51%	64.15%	79.29%	100.00%	84.05%
District of Columbia	71.63	29.32	48.65	71.20	57.74
Florida	85.01%	97.03%	98.76%	73.78%	89.08%

Table 3.8 (Continued)
Participation Rate (Based on One or More Claim) Overall, by Size and Type of Pharmacy, by State, 1991

STATE	SIZE		TYPE		TOTAL
	< $45,308 Per Month	≥ $45,308 Per Month	Chain	Independent	
Georgia	95.31%	98.77%	100.00%	91.85%	95.86%
Maryland	94.72%	98.85%	97.33%	92.80%	95.31%
North Carolina	92.08%	85.53%	98.91%	83.47%	90.76%
South Carolina	74.88%	90.88%	97.82%	55.71%	77.75%
Virginia	98.07%	99.43%	100.00%	92.22%	96.98%
West Virginia	71.76%	88.74%	99.91%	55.21%	77.19%
EAST SOUTH CENTRAL STATES					
Alabama	92.08%	94.28%	97.84%	88.91%	92.48%
Kentucky	78.54%	90.76%	99.50%	70.88%	81.89%
Mississippi	92.03%	97.78%	94.12%	92.33%	92.83%
Tennessee	90.11%	98.47%	98.93%	86.12%	91.72%
WEST SOUTH CENTRAL STATES					
Arkansas	81.29%	90.21%	99.64%	54.10%	85.73%
Louisiana	85.42%	94.01%	99.41%	80.23%	87.30%
Oklahoma	74.24%	93.43%	95.57%	70.13%	78.51%
Texas	88.78%	94.75%	97.18%	83.91%	90.54%
MOUNTAIN STATES					
Colorado	96.76%	90.18%	93.41%	96.21%	94.75%
Idaho	94.81%	100.00%	94.73%	96.75%	98.10%
Montana	70.00%	93.41%	70.83%	75.56%	74.24%
Nevada	88.14%	62.15%	48.28%	97.37%	85.50%
New Mexico	92.49%	94.29%	100.00%	88.13%	92.94%
Utah	98.85%	99.07%	99.11%	95.97%	97.58%
Wyoming	38.77%	64.28%	77.60%	21.57%	42.64%
PACIFIC STATES					
Alaska	70.69%	59.13%	84.44%	54.90%	66.93%
California	93.41%	97.61%	99.92%	91.21%	94.89%
Hawaii	45.83%	45.18%	57.15%	37.04%	45.60%
Oregon	94.04%	100.00%	97.44%	94.55%	95.89%
Washington	90.89%	92.28%	97.58%	87.17%	91.09%

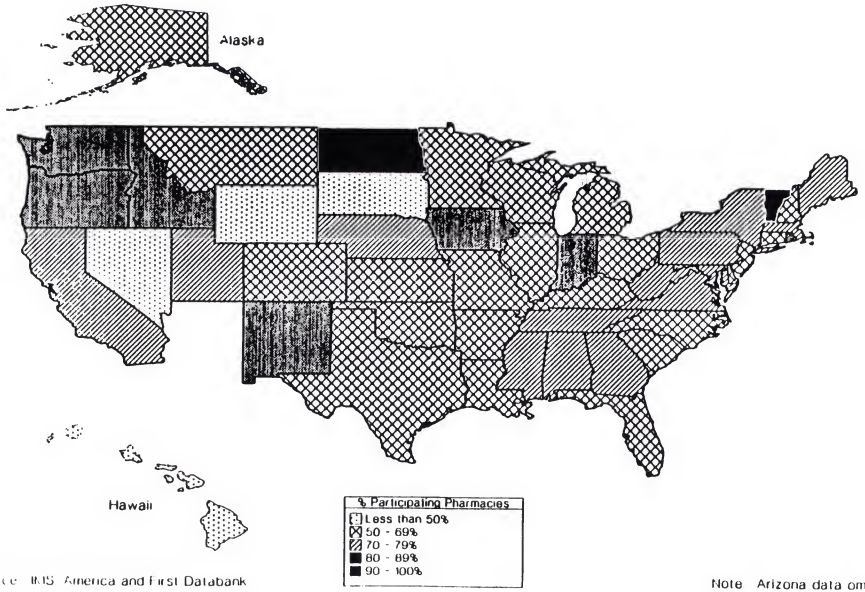
Table 3.7
Participation Rate (Based on 5% or More Medicaid Prescriptions) Overall, by Size and Type of Pharmacy, by State, 1991

STATE	SIZE		TYPE		OVERALL PARTICIPATION
	< $45,308 Per Month	≥ $45,308 Per Month	Chain	Independent	
U.S. Average	69%	67%	67%	68%	68%
NEW ENGLAND STATES					
Connecticut	55.84%	53.73%	59.99%	51.91%	54.91%
Maine	72.70%	85.83%	97.31%	46.01%	77.40%
Massachusetts	72.90%	84.57%	83.86%	71.81%	77.36%
New Hampshire	57.89%	47.12%	58.58%	48.98%	54.24%
Rhode Island	100.00%	73.89%	82.97%	93.33%	88.25%
Vermont	97.06%	100.00%	93.84%	100.00%	97.70%
MIDDLE ATLANTIC STATES					
New Jersey	65.48%	80.48%	71.98%	58.74%	63.56%
New York	71.42%	71.66%	75.39%	69.91%	71.50%
Pennsylvania	69.66%	72.46%	76.51%	66.02%	70.65%
EAST NORTH CENTRAL STATES					
Illinois	54.97%	50.15%	52.27%	54.12%	53.42%
Indiana	87.75%	83.24%	80.12%	95.15%	86.00%
Michigan	67.51%	62.87%	63.13%	67.32%	65.61%
Ohio	57.98%	66.64%	73.30%	46.24%	61.12%
Wisconsin	68.82%	56.03%	42.07%	76.10%	65.07%
WEST NORTH CENTRAL STATES					
Iowa	82.83%	85.68%	67.87%	89.95%	83.47%
Kansas	82.83%	53.20%	38.29%	72.02%	60.29%
Minnesota	82.04%	58.39%	45.29%	68.55%	61.03%
Missouri	72.84%	61.98%	56.92%	78.20%	69.38%
Nebraska	71.11%	71.00%	65.70%	73.37%	71.10%
North Dakota	90.78%	66.94%	84.21%	90.84%	90.13%
South Dakota	47.26%	55.58%	32.14%	53.28%	48.74%
SOUTH ATLANTIC STATES					
Delaware	84.67%	39.24%	55.26%	100.00%	65.56%
District of Columbia	49.30%	18.42%	40.54%	38.80%	39.84%
Florida	60.84%	62.26%	62.29%	59.80%	61.33%

Table 3.7 (Continued)
Participation Rate (Based on 5% or More Medicaid Prescriptions) Overall, by Size and Type of Pharmacy, by State, 1991

STATE	SIZE		TYPE		OVERALL PARTICIPATION
	< 145,308 Per Month	≥ 145,308 Per Month	Chain	Independent	
Georgia	76.71%	57.74%	64.47%	82.63%	73.70%
Maryland	73.74%	67.81%	68.12%	77.39%	72.08%
North Carolina	64.30%	49.26%	53.94%	58.13%	61.29%
South Carolina	60.90%	52.36%	58.85%	52.66%	61.19%
Virginia	73.30%	75.78%	72.33%	76.48%	73.96%
West Virginia	64.24%	66.42%	92.43%	50.94%	71.35%
EAST SOUTH CENTRAL STATES					
Alabama	75.54%	69.92%	66.96%	79.61%	74.58%
Kentucky	64.61%	62.68%	66.93%	62.37%	64.11%
Mississippi	78.55%	83.39%	77.50%	79.89%	79.23%
Tennessee	77.45%	80.12%	78.95%	77.49%	78.13%
WEST SOUTH CENTRAL STATES					
Arkansas	49.81%	66.82%	73.82%	44.96%	52.26%
Louisiana	68.43%	70.60%	78.08%	63.54%	68.91%
Oklahoma	60.02%	61.47%	60.54%	60.25%	60.35%
Texas	87.76%	50.99%	51.71%	73.91%	62.82%
MOUNTAIN STATES					
Colorado	59.85%	57.96%	56.23%	62.58%	59.26%
Idaho	86.12%	74.60%	68.96%	89.65%8	82.94%
Montana	58.10%	76.05%	51.76%	65.07%	61.36%
Nevada	34.07%	24.63%	18.58%	48.68%	29.91%
New Mexico	82.55%	84.12%	87.41%	78.64%	82.95%
Utah	69.41%	74.41%	65.94%	76.44%	71.05%
Wyoming	32.81%	65.43%	61.13%	23.42%	37.61%
PACIFIC STATES					
Alaska	68.69%	59.12%	78.15%	54.90%	64.37%
California	78.22%	69.48%	74.72%	76.12%	75.56%
Hawaii	45.83%	43.10%	55.39%	37.03%	44.85%
Oregon	84.85%	85.50%	83.83%	85.81%	85.04%
Washington	82.66%	78.62%	84.75%	79.82%	81.69%

Figure 3.2 Participation Rate Based on 5% or More Medicaid Prescriptions



Source: IMS America and First Databank

Note: Arizona data omitted

the Medicaid population on an on-going basis. The average percentage of pharmacies participating at this level (or higher) is around 68 percent and again, this percentage varies across the States. As Figure 3.2 shows, there are only two States for which this rate exceeds 90 percent and only seven more in which it ranges between 80-89 percent. For the majority of States the percentage of pharmacies involved in serving Medicaid enrollees at this level ranges from 50 percent to 79 percent.

It is interesting to compare these patterns of pharmacy participation to that of physician participation in Medicaid. Recently, the American Medicaid Association (AMA, 1989) reported that participation in Medicaid equaled approximately 75% nationwide (in 1988). A study of three States (Adams, 1992) found that participation rates dropped from around 65-70% using a minimal cut-off (1% of total revenues) to between 26-35% using a measure of greater involvement in Medicaid (at least 5% of total patient revenues). Thus, pharmacies have a higher Medicaid participation rate overall and a greater percentage of them participate at the higher service volume measure than physicians. This may indicate that physician participation in Medicaid deserves more attention.

The difference seen in the percentage of pharmacies participating at the two cut-offs (one claim versus five percent of prescriptions) may relate to a number of factors, some of which are more related to demand than supply. First, pharmacies may be willing to participate in Medicaid but only at a low level; that is, due to reimbursement levels or other factors, they want to limit the volume of services provided to Medicaid enrollees. This may be accomplished simply by the way they treat Medicaid clientele—waiting times, hours of operation, etc. Second, the location of pharmacies most likely plays a major role. Those pharmacies located in areas where few enrollees reside will have low Medicaid demand and volume. As noted, the analysis of the IMS America data indicated that pharmacies are less likely to locate in high poverty areas; this percentage varied across the States, from less than one percent to as high as 47 percent of pharmacies within a State were in high poverty zip codes. One implication of the finding that fewer pharmacies are intensely involved serving the Medicaid population is that Medicaid demand and hence, service provision may be highly concentrated among a relatively small set of pharmacies. At an extreme, concentration of Medicaid services could cause problems for both enrollees and pharmacies. Given the data available for this report, however, we could not accurately measure the concentration of Medicaid service provision among pharmacies.

When participation is measured based on the provision of five percent or more of total prescriptions, the overall participation rates for chains and independents are virtually equal; for chains, this rate equals 67 percent, and for independents it equals 68 percent. The comparable percentage of chains and independents participating at the five percent cut-off, given the smaller size of

independents, does not translate into a higher Medicaid volume than that for chains. Based on the IMS America data (after imputing) the average chain provides around 4,765 Medicaid prescriptions per year and the average independent, around 4,328. This represents only around 10 percent of total prescriptions for chains while it represents 15 percent of total prescriptions for independents. Thus, both chains and independents are important to the access of Medicaid enrollees but, apparently, in different types of neighborhood locations.

3.4.2 Variation in Participation by Area Poverty Level

As noted, the IMS America data were provided at the zip code level, which were further characterized by level of poverty. Only zip codes which actually contain pharmacies (whether participating or not) were included in the IMS America report. This allows for some preliminary analyses of the patterns of location of pharmacies and their participation at this level. The data show that pharmacies do not tend to locate in areas where there is a high degree of poverty. Of all pharmacies, around 50 percent are located in zip code areas characterized by a low level of poverty (15 percent or less of the population under 125 percent of poverty). Another 41 percent are located in zip code areas characterized by medium levels of poverty (15 to 30 percent of the population is under 125 percent of poverty). Only 9 percent of all pharmacies are in high poverty zip code areas; these are areas with more than 30 percent of the population with incomes under 125% of the poverty income level.

Overall, the participation rate among pharmacies, when based on one claim, is slightly lower in high poverty areas than in low poverty areas. For all pharmacies, 88 percent participate in areas with low poverty, while 84 percent participate in high poverty areas. The participation rates, when based on five percent of prescriptions, is 58 percent in low poverty areas, but equals 80 percent in high poverty areas. This provides evidence that more "intense" providers participate in high poverty areas.

Furthermore, location and participation patterns differ among chains and independents. Whereas only five percent of the chain pharmacies nationally are located in zip codes with high poverty rates, almost 12 percent of independents are located in these areas. Yet, the overall participation rate of independents, based on one claim, is *lower* than for chains (82 percent versus 93 percent). The participation rates for chains are 92 percent in low poverty areas and 98 percent in high poverty areas. for independent pharmacies these rates are 82 percent and 80 percent, respectively. Thus, while we would expect independents to be more likely to participate, given their location, they may be reluctant

to do so due to higher dispensing as well as ingredient purchasing costs. There may also be pharmacies that "specialize" in Medicaid in these areas, and hence, others choose not to compete for the Medicaid business. Given the structure of the data as reported to us by IMS America, however, we cannot test this hypothesis.

3.4.3 Other Measures Related to Access

The number of participating pharmacies per enrollee, reported in Table 3.8, helps relate the participation measures to access in that they account for the relative numbers of Medicaid enrollees. The number of participating pharmacies per 1,000 enrollees is shown in Table 3.8. On average, there are almost two participating pharmacies per 1,000 enrollees across the States. These ratios reflect all participating pharmacies (i.e., those submitting at least one claim). The majority of States have between 1.5 and 2.5 pharmacies per 1,000 enrollees. California, Hawaii and the District of Columbia have fewer than one participating pharmacy per thousand.

Other data in Table 3.8 show the number of prescriptions per enrollee and the percent drug recipients by eligibility category. The number of prescriptions per enrollee is used as a measure of access in the regressions reported later. The variation seen in this measure across States reflects their policies not only on drug reimbursement and coverage, but eligibility as well. It also reflects the underlying characteristics of the Medicaid population (age, sex, health status). In particular, we would expect the proportion of elderly enrolled in each State's program to affect the number of prescriptions per enrollee; we examine this factor in our later analysis.

3.5 RESULTS OF MULTIVARIATE ANALYSES

One of the goals of this study was to relate the measure of payment adequacy to measures of access for Medicaid enrollees. One way to do this is to use multiple regression analyses. In this section of the report we present regression analyses at both the State and county level. Two measures of access are used: 1) participation rates, based on submission of one claim; and 2) prescriptions per enrollee. As discussed in the chapter on data and methodology, the theoretical model (Appendix C) was used to guide the regression analyses.

Table 3.8
Access Measures: Participating Pharmacies Per Enrollee, and Utilization Measures, by State, 1991

STATE	PARTICIPATING PHARMACIES (BASED ON 1 CLAIM) PER 1,000 ENROLLEES	NUMBER OF Rxs PER ENROLLEE	PERCENT DRUG RECIPIENTS				
			CHILD	ADULT	DISABLED	AGED	TOTAL
NEW ENGLAND STATES							
Connecticut	1.8	9.8	71	N/A	N/A	73	58
Maine	1.2	10.2	56	67	83	87	67
Massachusetts	1.5	9.4	50	65	77	82	63
New Hampshire	2.8	12.7	58	64	78	77	65
Rhode Island	2.1	N/A	N/A	N/A	N/A	N/A	N/A
Vermont	1.8	10.6	62	65	81	87	68
MIDDLE ATLANTIC STATES							
New Jersey	2.2	12.1	67	71	80	80	72
New York	1.3	9.4	62	69	69	56	62
Pennsylvania	1.8	10.1	53	66	74	71	61
EAST NORTH CENTRAL STATES							
Illinois	1.4	8.4	52	60	74	68	58
Indiana	2.7	7.1	62	72	84	88	70
Michigan	1.3	9.3	54	67	79	81	62
Ohio	1.4	10.4	52	65	78	82	61
Wisconsin	1.5	9.6	36	46	77	86	51
WEST NORTH CENTRAL STATES							
Iowa	2.5	11.4	65	71	80	89	70
Kansas	2.3	7.3	50	64	75	82	61
Minnesota	1.8	9.9	52	62	72	88	60
Missouri	1.8	9.7	55	63	80	86	65
Nebraska	2.8	13.6	65	78	82	90	71
North Dakota	2.8	10.4	53	62	74	75	60
South Dakota	1.9	7.5	45	50	64	77	53
SOUTH ATLANTIC STATES							
Delaware	1.7	7.8	57	63	74	87	61
District of Columbia	0.6	7.1	42	58	59	61	50
Florida	1.8	10.9	36	N/A	77	85	60

Table 3.8 (Continued)
Access Measures: Participating Pharmacies Per Enrollee, and Utilization Measures, by State, 1991

STATE	PARTICIPATING PHARMACIES (BASED ON 1 CLAIM) PER 1,000 ENROLLEES	NUMBER OF Rxs PER ENROLLEE	PERCENT DRUG RECIPIENTS				
			CHILD	ADULT	DISABLED	AGED	TOTAL
Georgia	2.1	10.5	59	74	85	83	70
Maryland	1.7	7.0	43	53	66	77	52
North Carolina	2.0	7.6	53	67	73	66	61
South Carolina	1.8	8.8	53	71	81	76	65
Virginia	2.5	11.1	55	65	74	79	63
West Virginia	1.1	7.9	61	53	77	77	62
EAST SOUTH CENTRAL STATES							
Alabama	2.2	9.3	48	61	76	77	61
Kentucky	1.5	12.5	64	70	80	75	70
Mississippi	1.4	8.7	55	73	83	86	67
Tennessee	1.6	10.4	62	72	75	70	67
WEST SOUTH CENTRAL STATES							
Arkansas	1.5	11.4	61	68	81	90	68
Louisiana	1.5	12.0	65	76	81	87	72
Oklahoma	1.9	6.5	48	60	73	85	59
Texas	1.6	5.6	59	65	73	82	64
MOUNTAIN STATES							
Colorado	2.1	7.5	46	55	70	80	55
Idaho	2.6	9.0	55	60	78	72	61
Montana	1.8	8.6	49	61	77	86	52
Nevada	1.6	6.1	39	49	69	68	49
New Mexico	1.3	7.1	47	75	72	67	57
Utah	2.0	8.0	49	60	70	74	56
Wyoming	1.2	7.8	60	70	68	76	65
PACIFIC STATES							
Alaska	1.0	5.0	41	55	69	58	48
California	0.8	6.8	49	52	75	75	55
Hawaii	0.6	6.0	66	69	83	79	71
Oregon	1.8	6.9	51	57	78	81	58
Washington	1.5	8.8	59	67	78	85	65

3.5.1 State-Level Results on Participation

Table 3.9 reports the State-level equation for pharmacy participation. This equation, as noted, uses the less restrictive definition, based on the submission of one or more prescription claims to Medicaid.[7] Note also that this model transforms the participation rate to the logarithm of the odds of participation to increase the range of potential variation in the dependent variable. The means and standard deviations of the variables used in the State models are presented in Table 3.10. Note that the adjusted R^2 is reported in Table 3.9, since it is more appropriate when using small samples.

In this and other models tested, the adequacy measure is statistically insignificant. These included the index of adequacy presented in Table 3.2 as well as a dummy variable which categorized States on whether they were above or below 1.00 on the adequacy measure. These, too, were found statistically insignificant. As noted above, it may in fact be the case that no relationship exists between payment adequacy and pharmacy participation. But it is also possible that, due to data limitations, we simply don't have the ability to identify a significant relationship, even though it may exist.

Two characteristics of the pharmacy market are included in the equation shown in Table 3.9: 1) the percentage of pharmacies within the State that are independents and 2) the percentage of pharmacies located in high poverty (zip code) areas. Neither of these measures has a statistically significant association with pharmacy participation rates at the State level.

There are several variables (household income, level of insurance, hospital occupancy) included in the regression to measure the level of demand for privately financed services in the State; recall that the theoretical model predicts that higher private demand makes it less likely that private (marginal) revenue will fall below the Medicaid payment rates and thereby induce participation in Medicaid. The household income and hospital occupancy variables performed as expected in most equations tested. In Table 3.9, the coefficient for hospital occupancy is negative and statistically significant. With private insurance coverage included in the equation, the coefficient on household income is statistically insignificant. Interestingly, employer-based private insurance has a positive and statistically significant relationship with State pharmacy participation rates in contrast to our expectations based on the

[7]For both the State and the county models, alternative specifications using participation based on five percent or more of total prescription volume were also estimated. These results are not presented because they tended to duplicate the findings using the less restrictive definition of participation and may be more indicative of differences in demand rather than supply.

theoretical model. This may reflect the ability of pharmacies to shift unpaid costs to other third party insurers. The easier it is for pharmacies to shift these costs, the more likely they may be to accept Medicaid prescription payments.

Table 3.9
Determinants of Pharmacy Participation in Medicaid Based on Submission of One Claim, at State Level, 1991

DEPENDENT VARIABLE Participation Rate Based on One Claim (N = 48)	
INDEPENDENT VARIABLE	ESTIMATED COEFFICIENTS
Constant	-13.6440
Adequacy of State Payment:	
Ratio of Payment/Costs	7.8835
Pharmacy Market Characteristics:	
Ratio of Independent Pharmacies	-3.9134
Ratio in High Poverty Areas	1.9540
Other State Policies:	
Copayment	0.7375
Drug Utilization Review	-0.6298
Population Characteristics:	
Median Household Income	-0.0001
Percent Privately Insured:	
Employer-Based	0.1533**
Other Private	0.1238
Ratio of HMO Enrollees to Population	-6.4725
Ratio of Medicaid Enrollees to Population	16.1891
Other Area Characteristics:	
Physicians per Capita	5801.3158***
Growth in Number of Physicians 1989-90	0.5895**
Hospital Occupancy	-18.6880***
$(Adj.)R^2$	.26

** Significant at .05 level
*** Significant at .01 level

The remaining variables in Table 3.9 relate to other State policies and to the physician market environment. State policy variables—copayment requirements and drug utilization review programs—are statistically insignificant. Measures of the physician environment, however, are statistically significant. They indicate that the more physicians per person and the greater the recent growth in physicians within the State, the more likely pharmacies are to participate in Medicaid. This

may be the result of more competition among physicians for patients and hence, greater participation in Medicaid by physicians. This perhaps highlights the importance of access to physician services for Medicaid enrollees.

Table 3.10
Means and Standard Deviations of Variables Used in State-Level Regressions

DEFINITION	MEAN	STANDARD DEVIATION
DEPENDENT VARIABLES		
Ratio of Pharmacies Participating Based on Submission of One Claim	0.88	0.13
Number of Prescriptions Per Enrollee	9.01	2.03
INDEPENDENT VARIABLES		
Adequacy		
Ratio of State Payment to Estimated Costs	0.98	0.05
Delay in Payment	1.00	1.03
Pharmacy Characteristics		
Ratio Independent Pharmacies	0.57	0.12
Ratio Located in High Poverty Areas	0.09	0.09
Ratio Small (< $45,308 Per Month)	0.72	0.08
Other State Policies		
Copayment	0.43	0.50
Drug Utilization Review	0.47	0.50
Medically Needy	0.73	0.45
Population Characteristics		
Median Household Income	$29,462.08	$5,093.93
Percent Population with Private Insurance		
Employer-Based	75.08	6.18
Other Private	8.37	3.31
Ratio HMO Enrollees to Population	0.11	0.08
Ratio of Medicaid Enrollees to Population	0.12	0.03
Percent Elderly Population	12.22	2.20
Other Area Characteristics		
Physicians Per Capita	0.0018	0.00
Percentage Growth in Number of Physicians, 1989-90	2.09	1.50
Hospital Occupancy Rate	0.65	0.08

Overall, the equation in Table 3.9 explained 26 percent of the variance in the log odds of pharmacy participation in Medicaid.

3.5.2 State Results on Prescriptions per Enrollee

Although participation rates are one measure of access to pharmaceutical services, we are also interested in the actual utilization of pharmacy services this participation affords. In the equations in Table 3.11, determinants of prescriptions per enrollee at the State level are examined. As with the participation rate equation, the coefficient for adequacy of payment is statistically insignificant in equation i in Table 3.11. In other equations tested, the measure of physician payment generosity across the States (reported in Table 3.9) was also found to be insignificant. In fact, the only variable that *was* statistically significant as shown in the equation was the elderly population percentage in the State. This variable was positive and statistically significant in both versions of the equation.

Overall, equation ii explained eight percent of the variance in prescriptions per enrollee. Also included in Table 3.11 is an equation which uses the participation rate in place of the adequacy measure. We tested this version of the model since the adequacy measure only indirectly affects the utilization of services via its effect on participation rates. The inclusion of the participation rate, however, does not alter the results and the coefficient is statistically insignificant.

3.5.3 County Level Results on Participation

Although the results on the State level are informative, county level regressions were tested in order to examine issues in areas more akin to "markets" and to test for differences in urban and rural areas. One drawback of testing the hypothesis at the county level is that the adequacy of payment measure was derived only at the State level. This measure was therefore adjusted to reflect the relative wage and capital costs in the urban and rural counties of each State. An index was derived using the wage and capital indices used in the Prospective Payment System to adjust hospital payments across urban and rural counties of each State (CCH, 1992). The urban and rural values for wage and capital indices were weighted by the percent of dispensing costs represented by wage (a little over 70%) to derive an overall index. The measure used in the equations, then, is simply each county's State payment for the market basket divided by this index.

In order to allow for testing of the effect of payment adequacy in these equations, the county data are pooled, or combined, across States. There are a total of 930 counties in the data set

analyzed; this reflects the number of counties in the States chosen for county-level analysis which contain at least one pharmacy. An additional measure used at the county level (not at the State level) represents the concentration of total prescriptions provided by the four pharmacies with the greatest volume in each county. To the extent this measure reflects the lack of competition in the county, we would expect this to have a negative effect on participation and service provision.

Table 3.11
Determinants of Prescriptions Per Enrollee at the State Level, 1991

DEPENDENT VARIABLE Prescriptions Per Enrollee (n = 48)		
INDEPENDENT VARIABLE	ESTIMATED COEFFICIENTS	
	(i)	(ii)
Constant	-8.0199	-8.5702
Payment Adequacy	-0.0261	--
Delay in Payment	-0.4316	-0.3920
Participation Rate	--	1.8473
Pharmacy Market Characteristics:		
Ratio in High Poverty Areas	8.2916	7.1173
Ratio of Independent Pharmacies	-0.0178	0.7754
Other State Policies:		
Copayment	-0.7473	-0.6842
Drug Utilization Review	-0.0933	0.0033
Medically Needy	0.8595	0.8108
Population Characteristics:		
Median Household Income	0.0001	0.0002
Percent Privately Insured:		
Employer-Based	0.1260	0.1051
Other Private	0.0032	-0.0082
Percent Elderly	0.4312**	0.4324**
Ratio of Medicaid Enrollees to Population	12.7403	11.2663
Other Area Characteristics:		
Physicians per Capita	806.8522	-1089.0732
Hospital Occupancy	-3.8857	-2.8276
(Adj.)R^2	.06	.08

** Significant at .05 level

The results for the participation equation are shown in two equations in Table 3.12. The means and standard deviations of the variables used in the county level regressions are reported in Table 3.13. The dependent variable in the equations in Table 3.12 has been transformed as well. In equation i, the measure of payment adequacy is statistically significant and negative, certainly not an expected result. Although the number of counties is obviously much larger than the number of States, which introduces more variation in the data, it is important to remember that the adequacy measure used in the county equations does not vary within States except for the adjustments made for relative wage and capital costs in urban and rural counties. We would expect the higher the relative wage and capital costs, the lower the probability of participating, all else held constant. This coefficient may be reflecting this or other State characteristics that influence participation. In equation ii we have included State dummy variables and omitted the policy variables in equation i. As this shows, the adequacy measure is then found to be insignificant.

The coefficients on the characteristics of the pharmacy market are somewhat puzzling in these county level regressions. The measure of the concentration of pharmacy volume is positively related to participation and statistically significant. This result may be reflecting certain areas (e.g., rural) where there is only one pharmacy and, perhaps, an obligation to participate; there may also be limited private demand in these areas.

The coefficient for the percentage of pharmacies in high poverty areas was positive but statistically insignificant. However, the interaction of the percent of independents with the percent of pharmacies located in high poverty areas was negative and statistically significant. This result implies that the higher concentration of independents in high poverty areas results in lower rates of pharmacy participation in Medicaid. One explanation may be relatively higher costs for these independent pharmacies.

The results on the State policy variables in equation i are of interest. The coefficient on whether the State requires a copayment is statistically significant and negative. This may indicate either a demand or supply side response to the required copayment. The remaining two policy variables are not statistically significant. The presence of a medically needy program has a positive influence on the participation rate, perhaps indicative of greater demand by those with acute illnesses qualifying under the medically needy program.

Table 3.12
Determinants of Participation Rates (Based on One Claim) at County Level, 1991

DEPENDENT VARIABLE Participation Rate Based on One Claim (n=930)		
INDEPENDENT VARIABLE	ESTIMATED COEFFICIENTS	
	(i)	(ii)
Constant	11.4523	-2.6554
Ratio of Payment/Costs	-0.2204***	0.1835
Pharmacy Market Characteristics:		
Ratio in High Poverty Areas	1.7654	3.3102
Ratio of Independent Pharmacies Multiplied by Ratio in High Poverty Areas	-5.9318**	-6.4800***
Concentration of Market	4.2039***	4.7019***
Other State Policies:		
Copayment	-1.7165***	--
Drug Utilization Review	-0.8617	--
Medically Needy	1.8492***	--
Population Characteristics:		
Personal Household Income	-0.0000	-0.0619
Percent Elderly	-0.0851	-0.0620
Percent Medicaid	-0.0298	-0.1340***
Other Area Characteristics:		
Physicians per County	-0.0001	-0.0000
Percent Enrolled in HMO	-0.0068	-0.0081
Percent Low Birth Rate	-0.1593	0.0565
State Dummy Variables:	--	(coefficients not shown)
(Adj.) R^2	.11	.21

** Statistically significant at <.05 level
*** Statistically significant at <.01 level

Of the three variables measuring county population characteristics—personal household income, percent elderly, and percent Medicaid—only the latter two were found to have a statistically significant relationship with county pharmacy participation rates in either equation. Interestingly, the Medicaid population percentage was found to be *negatively* associated with pharmacy participation rates. This finding may possibly reflect the unwillingness of pharmacies to locate in areas where Medicaid clients will represent a large share of their business.

Table 3.13
Means and Standard Deviations of Variables Used in County-Level Regressions

DEFINITION	MEAN	STANDARD DEVIATION
DEPENDENT VARIABLES		
Ratio of Pharmacies Participating Based on Submission of One Claim	0.82	0.23
Ratio of Pharmacies Participating Based on 5% of Total Prescriptions	0.72	0.25
Number of Prescriptions Per Enrollee	10.44	6.78
INDEPENDENT VARIABLES		
Adequacy		
Ratio of State Payment to Urban/Rural Cost Index	27.09	3.75
Pharmacy Characteristics		
Ratio of Independent Pharmacies	0.69	0.24
Ratio Located in High Poverty Areas	0.14	0.31
Concentration of Market		
Ratio of Total Rxs Provided by Top Four Providers	0.71	0.29
Other State Policies		
Copayment	0.40	0.49
Drug Utilization Review	0.66	0.47
Medically Needy	0.82	0.39
Population Characteristics		
Personal Income Per Household	$40,289	$8,757.59
Percent Population Enrolled in an HMO	2.84	22.16
Percent Elderly Population	15.01	4.20
Percent County Population Enrolled in Medicaid	12.03	7.56
Percent Low Birth Weight	6.13	2.31
Other Area Characteristics		
Physicians in County	155	708

A low birth weight variable was also tested in the county-level regressions. The low birth weight variable is used as an indicator of areas with more inner city problems characteristic of areas with high poverty, substance abuse, etc.; it was not statistically significant. Other area characteristics,

such as the number of physicians per county and the county HMO membership percentage were also not statistically significant in equations i and ii.

Overall, the county model with State policy variables explained 11 percent of the variance in the log odds of pharmacy participation rates. The model using State dummy variables explained 21 percent.

3.5.4 County Results on Prescriptions Per Enrollee

The last set of regressions, presented in Table 3.14, are for the prescriptions per enrollee measure at the county level. We are interested in the adequacy of payment because of its influence on participation rates and, ultimately, access and utilization. In the equations in Table 3.14, we tested the relationship of participation rates to one measure of access, prescriptions per enrollee; in specifications using the adequacy measure directly, it was found to be negative and/or statistically insignificant. In equation i, the participation rate was defined using the less restrictive definition; in equation ii, the participation rate was based upon the five percent of prescriptions criteria.

Equations i and ii show that the participation rate of pharmacies within a county has a direct and positive impact on the number of prescriptions per enrollee, as would be expected. It is statistically significant at both levels of participation. Other market characteristics, however, such as the percent in high poverty areas and the percentage of independents in these areas were not found significant. In equation ii the measure of market concentration was statistically significant and negative.

State policies had differing effects in the two equations. In equation ii, the requirement of a copayment by the State was found to be negative and statistically significant. The presence of a drug utilization program was negative in equation i. The medically needy program variable was statistically insignificant. In both equations, two of the county population characteristics—county elderly population percentage and Medicaid percentage—were statistically significant. The county population percentage was positively associated with the number of prescriptions per enrollee, as hypothesized. The Medicaid percentage was negatively associated with the number of prescriptions per enrollee. The latter result may reflect a "crowding" effect if Medicaid enrollees are concentrated in areas where there are insufficient participating providers. Since the data may also reflect variations across States, it may be that States with large Medicaid populations attempt to control costs through prior approval, refill policies, etc. Finally, the number of physicians per county were found to be negatively associated with

prescriptions per enrollee in both model specifications. This is an unexpected finding and one that is hard to explain. The remaining characteristic, percent low birth weight, was not statistically significant.

Table 3.14
Determinants of Prescriptions Per Enrollee at County Level, 1991

DEPENDENT VARIABLE Prescriptions Per Enrollee (n = 930)		
INDEPENDENT VARIABLE	ESTIMATED COEFFICIENTS (i)	 (ii)
Constant	2.2399	1.0175
Pharmacy Market Characteristics:		
Participation Rate Based on 5% Prescriptions	—	12.7221***
Participation Rate Based on One or More Medicaid Claim	11.5033***	—
Ratio in High Poverty Areas	1.3993	2.1335
Ratio Independent Multiplied by Ratio in High Poverty Areas	1.4501	0.4173
Concentration in Market	-1.1704	-2.9519***
Other State Policies:		
Copayment	-0.7132	-1.3521***
Drug Utilization Review	-0.9810**	-0.2904
Medically Needy	-0.6060	-0.7123
Population Characteristics:		
Personal Household Income	0.0000	0.0001***
Percent Elderly	0.2697***	0.2532***
Percent Enrolled in HMO	-0.0059	0.0045
Percent Medicaid	-0.2211***	-0.2832***
Other Area Characteristics:		
Physicians per County	-0.0003	-0.0003
Percent Low Birth Weight	-0.1397	-0.0756
(Adj.) R^2	23	.31

** Statistically significant at <.05 level
*** Statistically significant at <.01 level

Overall, equation i in Table 3.14 explained 23 percent of the variance in prescriptions per enrollee at the county level; equation ii explained 31 percent of the variance.

IV. STUDY LIMITATIONS

This study has advanced our knowledge of the relative costs of purchasing drugs and the adequacy of States' payments. It has added to our understanding of the factors affecting pharmacy participation in Medicaid. And it has indicated market area (county-level) factors that are associated with pharmacy participation and prescriptions per enrollee. Yet, there are several limitations that should be kept in mind as the results are reviewed and as future research is designed. Limitations regarding the data and analytic methods used include:

- Lack of actual data on Medicaid payments for the drug products included in the market basket required the use of a simulation and, hence, the incorporation of several simplifying assumptions. Since States pay the lesser of usual charges and estimated costs, our measures of payment are perhaps biased upward.

- Lack of State-level data on pharmacies' costs for drugs purchased and dispensed required making assumptions about the relative ability of large and small chain and independent pharmacies to receive discounts when purchasing ingredients for dispensing. Given this and no information on off-invoice discounts, our ingredient cost estimates are subject to error.

- Dispensing cost estimates were largely based on survey data which are not uniformly collected and have low response rates.

Even though these are shortcomings of the current study, the estimates of acquisition costs in each State have not been heretofore available, especially based on the same method for deriving each States' value. In addition, the simulated payments and comparisons of them to the estimated costs seemed to generate reasonable results and were found comparable to other measures of State payment where available.

Other shortcomings of the study relate more to issues that could not be examined at all, given the data and resources allocated to this study:

- No examination of the adequacy of Medicaid payments relative to that of other third parties. This limits our ability to discern the "adequacy" of Medicaid payments and its relation to participation decisions;

- Limited ability to look within geographic areas (counties) such as inner city areas and/or high poverty areas where enrollees may be concentrated;

- No information on the role that hospital-based pharmacies play in providing Medicaid enrollees access to pharmaceutical services either overall or in inner city areas;

- No ability to look at issues over time—the effects of pharmacy closures on access and/or decisions of previously participating pharmacies to either quit participating or limit service provision; and

- Lack of ideal or detailed access measures to address questions regarding travel distances or instances when enrollees are actually turned away from pharmacies after seeking care.

As noted above, this study was not able to examine the payment rates of other third parties. While most of them reimburse on the basis of formulae similar to Medicaid which would allow for simulation of payment rates, there are other details of their reimbursement policies (e.g., generic substitution, maximums, etc.) which are more difficult to gather data on and to simulate. Although this issue was not thoroughly explored in this study, some information was gathered via phone calls. This information suggested private third parties often reimburse on the basis of AWP -10% with dispensing fees in the range of $2-4.00. This would suggest third parties may be reimbursing at or below Medicaid levels. While this may suggest that Medicaid pays well compared to other third parties, the larger the portion of total volume reimbursed below average costs, the more likely financial problems will develop. The payment policies of other third parties and their impact on pharmacy operations is an important issue for further research.

V. SUMMARY AND DISCUSSION

The key findings of this study in each of the major areas of the analysis—adequacy of States' payments and access for enrollees—can be summarized as follows:

Adequacy

- Overall, States are paying 95-100 percent of estimated total average costs, before profits, of dispensing drug products;
- States tend to pay more than adequately for the ingredient cost component, as estimated here, but less than adequately for the dispensing cost component; and
- No clear patterns are seen in the adequacy of payment by geographic region but those States which base payment on a mark-up from WAC tend to have lower measures of adequacy.

Access

- Participation rates of pharmacies based on submission of one or more claims are uniformly high across the States, averaging 86 percent;
- Participation rates based on provision of five percent or more of prescriptions to Medicaid enrollees are significantly lower, averaging around 68 percent;
- Location of pharmacies in areas of high poverty is likely to play an important role in determining participation rates; pharmacies are less likely overall to be located in these areas and pharmacies located there tend to be independents;
- Participation rates based on one or more claims were lower overall for independents than for chain pharmacies but participation rates were quite similar when based on five percent or more of total prescriptions.

The findings indicate that States are paying quite close to estimated average pharmacy costs. If costs are accurately reflected in the analysis, it would seem that these payment levels are more than adequate to induce participation among many pharmacies. They may also compare well to Medicaid payments to physicians, which averaged 74 percent of Medicare payments for the same services (Holahan, 1992), although comparisons to other third party payments for pharmacy services were not included in this study. There is little statistical evidence from this study that adequacy of payment to pharmacies influences access. However, the number of participating pharmacies does appear to affect the number of prescriptions per enrollee.

The analyses performed in this study provide insight into several aspects of State and Federal policy with respect to payment for pharmacy services. On average, the majority of States appear to be paying adequately enough to encourage participation among pharmacies. Problems may exist, however, for small independent pharmacies that are affected by higher fixed costs per prescription and less ability to obtain discounts on ingredient purchases. While States' payments are more closely related to estimated ingredient costs, there are greater disparities in terms of payments and estimated costs for the dispensing of drug products.

The provision of accessible and high quality pharmacy services is essential for Medicaid recipients when they experience episodes of acute and/or chronic conditions. The findings of this broad study provide some insight regarding the adequacy of Medicaid reimbursements and the access of Medicaid enrollees for pharmacy services. Overall, it indicates that payments are in line with costs and participation rates are high. Still, given the limitations of the present study, States may need to gather further information to fully understand the dynamics of pharmacy payment methods and enrollee access.

In the multivariate analysis that was part of this study, the effects of other State policies (e.g., co-pay, drug utilization review, prior approval, etc.) were found to have little impact on access measures. However, States should be aware of how all their drug policies work independently and together to provide access to high quality services.

Moreover, States should review physician participation within their Medicaid programs and how it relates to enrollee access for needed primary care as well as pharmaceuticals. Indeed, the focus may be properly placed not only on payments to pharmacies but also on payments to physicians since the latter show lower participation rates and are the first step in access to medical care.

Since this study could not gather ideal or detailed measures of access, States may wish to monitor access of enrollees using either claims or survey data. Information on access for enrollees in various geographic areas throughout the State would be useful in this monitoring process. The access issues that may arise in inner city areas where enrollees are concentrated for example, may be quite different from those that affect enrollees residing in other city, suburban or isolated rural environments. Travel distance and time should be explored for all areas.

This study did not address the overall goals and structure of payment methods but some statements can be made regarding this issue. In general it is difficult for public payers to gauge the

right level of payment for all pharmacies. Clearly, the most efficient administrative method is to develop an average payment that does not vary across pharmacies. The concern with this policy is that some pharmacies will be "overpaid" while others will be "underpaid" with respect to average costs. Public payers may wish to vary average payments across pharmacies if there are factors beyond the control of the pharmacy (e.g. crime in the area, labor costs, etc.) that also affect the access of enrollees. If States find there are particular areas with access problems, changes in the payment structure might be constructive. For example, if there are non-participating pharmacies located in areas with high concentrations of poverty and there are demonstrable access problems, these particular pharmacies could be given financial incentives to encourage participation. In addition, further research is needed on the role of hospital-based pharmacies in providing services to enrollees, especially in the inner city areas.

This study provided some insight on the adequacy of State payment for pharmacy services. However, data on actual costs and payments would allow for a better analysis of the adequacy of payment and the implementation of any alternative payment methods. Through either accounting data and/or cost surveys, States could improve their understanding of the differences in the costs of dispensing drugs between smaller versus larger pharmacies, chains versus independents, and pharmacies located in urban versus rural areas. Although it appears that across the States relatively low payments for dispensing fees are balanced by relatively high payments for ingredient costs, States may want to better align payments with each component cost (ingredient and dispensing) before considering restructuring of payment methods. Medicaid payments could then work in tandem with competitive pressures to produce pharmacy services at the lowest per unit costs.

If payment policy is believed to be an effective tool for influencing pharmacy behavior, States might consider incentives that encourage efficiency in dispensing and the use of generics. Alternatively, if a competitive bid process could be used to determine the lowest price at which pharmacies in a certain area are willing to provide services, this could be an optimal arrangement if the average costs of a competitive market are thereby revealed. However, it is important to realize that some pharmacies might bid at marginal costs which may not be sustainable in the long-run. There would also be numerous complexities to address in terms of the spatial location of the pharmacies with the lower bids, the number of bids to accept, the terms of the contract between public payer and pharmacy and dissemination of information of participating pharmacies to enrollees. If undue travel burdens are not placed on enrollees as a result of competitive bidding, such a policy could be beneficial to all.

It does not seem that it is the role of the public payer to assure that the average costs of all pharmacies are covered. Certainly, it should not seek to cover the costs of a pharmacy that is either inefficient and therefore has higher average costs, nor one that sets prices higher than average in order to make excessive profits. It also is not necessary that all payers pay average costs. As the theoretical model used in this study highlights, Medicaid can pay less than average costs and still induce participation among pharmacies as long as payments are in excess of marginal costs. Public payments that are less than average costs might be justified on the basis of increased demand/volume for providers; similar "discounts" may be achieved by HMOs through negotiation and contract. On the other hand, if the public payer consistently pays below average costs, inclusive of a typical rate of profit, the pharmacy, as any other provider, may seek to recoup these "losses" by charging higher prices to private payers than they otherwise would. This could impact on the financial stability of providers that rely heavily on payers that are paying below average costs, perhaps eventually affecting access.

While the lack of detailed data prevented a more definitive study, the State-level analyses presented here provide baseline information for future studies to address in more detail access to pharmacy services by Medicaid recipients.

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APPENDIX A

Description of Data Sources from IMS America

DESCRIPTION OF DATA SOURCES FROM IMS AMERICA

A significant amount of data were drawn from the data bases available through IMS America. The primary uses of these data were to derive State-level estimates of the ingredient cost for a market basket of drugs and participation rates of pharmacies by size and type. The data needed for these purposes came from two separate sources at IMS America. These are described below:

- The U.S. Drugstore Audit data base gives information on the dollar and unit volume of pharmaceutical products purchased by independent pharmacies, chain drug stores, proprietary stores and discount drugstores across the country. The information is obtained from two sources. The first is a randomly selected panel of 840 retail outlets representative by size, type and census region which give information regarding direct purchases, or those made directly from the drug manufacturer. The second source is a near-census of wholesalers who supply information on 70 percent of indirect purchases. Information on the remaining 30 percent of indirect purchases are obtained from a warehouse subsample, projected to the universe of warehouses. Data items used in the analysis include:

    - Product form, strength, package size and number of packages;
    - Manufacturer; and
    - Volume and amounts paid.

The wholesale data are the primary data used to generate the average per-unit costs for the market basket of drugs (approximately 1,600 products) described earlier. The per-unit costs were derived from all sales (not just those related to Medicaid) by wholesalers to chains and independent pharmacies during the 4th quarter of 1991 at the regional level. These prices are the basic building block for the derivation of ingredient cost estimates for each drug and in each State. We note that these costs do not reflect discounts that occur off-invoice (e.g., off-invoice rebates and discounts for payment within 30 days), and hence may slightly overestimate true acquisition costs. To move from the region to State estimates, data from another IMS America data source, the prescription data base, is needed.

- The Prescription Data Base is intended to measure the volume of prescriptions sold through retail pharmacies with a sample of pharmacies nationwide. Included in the sample are chain and independent pharmacies, including chain discount houses and food store pharmacies. As of August 1992, this data base included 27,000 pharmacies or approximately 50 percent of the universe. The data collected on pharmacies and used in this analysis include:

    - County location;
    - Poverty level of zip code within county; and
    - Number of prescriptions by payor source (Cash, Private Third Party, Medicaid).

IMS America recruits a sufficient number of pharmacies, representative of the population by size, type and location, to enable statistical reliability in extrapolating to the universe. The 1992 sample of 27,000 is larger than necessary for this statistical purpose. Pharmacies participate on a

voluntary basis and are reimbursed for their expenses, although the amount is not large and pharmacies cannot ask to be participants.

There is a greater representation of chains versus independents among the 27,000 in the IMS sample and among the 22,038 on which we received data. While this number represents an overall sample rate of 41%, the rate for chains is almost 65% and for independents, 23%. This makes the use of sample weights important to the extrapolation process.

IMS America used this file to provide counts of pharmacies participating in Medicaid at the two cut-off points and estimates of total prescriptions by payor source (cash, Medicaid, other third party); these were provided by county (and 5-digit zip code areas within these counties for some States and for summary zip code areas in others). Data were drawn for the month of December 1991. In addition, IMS America provided the total number of pharmacies within each State, county and for the several types of pharmacies and zip codes within counties. These data are used as a base for the participation rates and to derive sample weights. Some zip code areas which contained pharmacies had no representation in the IMS America sample. These are treated as missing data and a sample-weighted regression is used to impute missing values. For those zip codes with sample data, the sample weight is used to extrapolate the participation and prescription measures to the population. Extrapolated data were found to be in agreement with other data sources on such measures as prescriptions per enrollee, percent Medicaid, etc. Other uses of these data include the derivation of a county-level measure of prescriptions per enrollee (enrollee counts from another source), a crude measure of the concentration of the pharmacy market and location of chains and independents in high poverty areas.

Note: Information derived from the data supplied by IMS, America is based on the methodology developed by SysteMetrics, a division of MEDSTAT Systems, described herein. IMS, America claims no responsibility for extrapolation, analysis or interpretation of the data beyond that originally provided.

APPENDIX B

List of Market Basket Drugs by Brand and Generic Names

Table B.1

List of Market Basket Drugs by Brand and Generic Names

DRUG LIST BY BRAND NAME		DRUG LIST BY GENERIC NAME	
Brand Name	Generic Name	Generic Name	Brand Name
amoxil 250mg susp	amoxicillin	acetaminophen w/ codeine	tylenol w/ codeine #3
anaprox 275mg	naproxen sodium	acyclovir	zovirax 200mg
atrovent inhaler	ipratropnum bromide	albuterol inhaler	proventil inhaler
augmentin 250mg	amoxicillin/k clavulanate	alprazolam	xanax 0.5mg
benadryl 25mg	diphenhydramine	amytriptyline	elavil 25mg
buspar 10mg	buspirone HCl	amoxicillin	amoxil 250mg susp
calan sr 240mg	verapamil HCl	augmentin 250mg	amoxicillin/k clavulanate
capoten 25mg	captopril	azternazole	hismanal 10mg
carafate 1gm	sucralfate	atenolol	tenormin 50mg
cardizem 30mg	diltiazem HCl	baclofen	lioresal 10mg
cecior 250mg cap	cefaclor	benztropine mesylate	cogentin 2mg
ceftin 500mg	cefuroxime axetil	bromocriptine mesylate	parlodel 2.5mg
cipro 500mg	ciprofloxacin HCl	buspirone HCl	buspar 10mg
clinoril 200mg	sulindac	captopril	capoten 25mg
cogentin 2mg	benztropine mesylate	carbamazepine	tegretol 200mg
coumadin 5mg	warfarin sodium	carbidopa/ levodopa	sinemet 25/100
darvocet-N 100	propoxyphene napsylate/acetamin	cefaclor	cecior 250mg cap
deltasone 5mg	prednisone	cefuroxime axetil	ceftin 500mg
depakote 250mg	divalproex sodium	cephalexin HCl	keftab 500mg
deponit 0.2mg/hr ptch	nitroglycerin	cimetidine	tagamet 400mg
diabeta 5mg	glyburide	ciprofloxacin HCl	cipro 500mg
dilantin 100mg	phenytoin sodium	clemastine/ phenylpropanolamine	tavist-d teb sr
dolobid 500mg	diflunisal	clonazepam	klonopin .5mg
dyazide	hctz/triamterene	cyclobenzaprine HCl	flexeril 10mg
elavil 25mg	amytriptyline	cyclosporine	sandimmune 100mg
erythrocin 250mg	erythromycin stearate	diflunisal	dolobid 500mg
feldene 20mg	piroxicam	digoxin	lanoxin 0.125mg
flexeril 10mg	cyclobenzaprine HCl	diltiazem HCl	cardizem 30mg
glucotrol 10mg	glipizide	diphenhydramine	benadryl 25mg
halcion 0.125mg	triazolam	dipyridamole	persantine 25mg
haldol 1mg	haloperidol	divalproex sodium	depakote 250mg
hismanal 10mg	astemizole	enalapril maleate	vasotec 10mg
humulin n 100	insulin nph human recomb.	erythromycin stearate	erythrocin 250mg
inderal 40mg	propranolol	famotidine	pepcid 40mg
insulin nph u100	insulin nph (or lente)	fluoxetine HCl	prozac 20mg
kaon-cl	potassium chloride	furosemide	lasix 40mg
keftab 500mg	cephalexin HCl	gemfibrozil	lopid 300mg
klonopin .5mg	clonazepam	glipizide	glucotrol 10mg
lanoxin 0.125mg	digoxin	glyburide	diabeta 5mg
lasix 40mg	furosemide	haloperidol	haldol 1mg
lioresal 10mg	baclofen	hctz/triamterene	dyazide
lithonate	lithium carbonate	ibuprofen	motrin 600mg
lopid 300mg	gemfibrozil	indomethacin	lozol 2.5mg

List of Market Basket Drugs by Brand and Generic Names (Continued)

DRUG LIST BY BRAND NAME		DRUG LIST BY GENERIC NAME	
Brand Name	Generic Name	Generic Name	Brand Name
lopressor 100mg	metoprolol tartrate	insulin nph human recomb.	humulin n 100
lozol 2.5mg	indapamide	insulin nph (or lente)	insulin nph u100
mellaril 50mg	thioridazine HCl	ipretropium bromide	atrovent inhaler
mevacor 20mg	lovastatin	ketoprofen	orudis 75mg
motrin 600mg	ibuprofen	levothyroxine sodium	synthroid .1mg
nolvadex 10mg	tamoxifen citrate	lithium carbonate	lithonate
noroxin 400mg	norfloxacin	lovastatin	mevacor 20mg
ortho-novum 7/7/7	norethindrone-ethinyl estradiol	metoprolol tartrate	lopressor 100mg
orudis 75mg	ketoprofen	naproxen sodium	anaprox 275mg
pamelor 25mg	nortriptyline HCl	nifedipine	procardia 10mg
parlodel 2.5mg	bromocriptine mesylate	nitroglycerin	deponit 0.2mg/hr ptch
penVK 250mg	penicillin V potassium	norethindrone-ethinyl estradiol	ortho-novum 7/7/7
pepcid 40mg	famotidine	norfloxacin	noroxin 400mg
percocet	oxycodone/acetaminophen	nortriptyline HCl	pamelor 25mg
persantine 25mg	dipyridamole	oxycodone/acetaminophen	percocet
phenobarbital 30mg	phenobarbital	penicillin V potassium	penVK 250mg
procardia 10mg	nifedipine	pentoxifylline	trental 400mg
proventil inhaler	albuterol inhaler	phenobarbital	phenobarbital 30mg
prozac 20mg	fluoxetine HCl	phenytoin sodium	dilantin 100mg
retrovir 100mg	zidovudine	piroxicam	feldene 20mg
sandimmune 100mg	cyclosporine	potassium chloride	keon-cl
seldane 60mg	terfenadine	prednisone	deltasone 5mg
septra ds	sulfamethoxazole/trimethoprim	propoxyphene napsylate/acetamin	darvocet-N 100
sinemet 25/100	carbidopa/ levodopa	propranolol	inderal 40mg
synthroid .1mg	levothyroxine sodium	ranitidine	zantac 300mg
tagamet 400mg	cimetidine	sucralfate	carafate 1gm
tavist-d teb se	clamastine/ phenylpropanolamine	sulfamethoxazole/trimethoprim	septra ds
tegretol 200mg	carbamazepine	sulindac	clinoril 200mg
tenormin 50mg	atenolol	tamoxifen citrate	nolvadex 10mg
theo-dur 300mg	theophylline	terfenadine	seldane 60mg
timoptic 0.5% drops	timolol maleate eye drops	theophylline	theo-dur 300mg
trental 400mg	pentoxifylline	thioridazine HCl	mellaril 50mg
tylenol w/ codeine #3	acetaminophen w/ codeine	timolol maleate eye drops	timoptic 0.5% drops
vasotec 10mg	enalapril maleate	triazolam	halcion 0.125mg
xanax 0.5mg	alprazolam	verapamil HCl	calan sr 240mg
zantac 300mg	ranitidine	warfarin sodium	coumadin 5mg
zovirax 200mg	acyclovir	zidovudine	retrovir 100mg

APPENDIX C

Model of Supply and Demand for Medicaid Pharmaceutical Services

MODEL OF SUPPLY AND DEMAND FOR MEDICAID PHARMACEUTICAL SERVICES

The basic model of pharmacy behavior and determinants of Medicaid participation presented here focuses on the cost structure of the pharmacy and its implications for pharmacy behavior in response to Medicaid payment policies. We note again some basic facts about pharmacies that set the stage for this behavioral model. These salient facts include:

- Medicaid pharmacy services are provided by a variety of types of pharmacies (hospital-based, independent, chain drug stores, supermarkets, and others);
- For many providers, drugs are not the only type of goods sold or services provided;
- For most providers, Medicaid is a relatively small fraction of the total business;
- Much of the cost of providing prescriptions is not under the control of the pharmacy; and
- The marginal cost of filling prescriptions represents most of the per unit cost.

Our model builds on these facts. Figures C.1 and C.2 provide a graphical representation of a basic model of the economics of pharmacy operations with both private and Medicaid payment. In Figures C.1 and C.2, the model represents a downward-sloping private-sector demand curve that represents some degree of local market power. This market power may stem from the unwillingness of people to travel far beyond their residence for these services.

Pharmacy costs consist of the fixed costs of operation plus the variable cost of dispensing prescription drugs that, for pharmacies, do not appear to vary significantly with volume over a large range of production. The details of this cost structure and its implication for the average costs of dispensing were discussed in Section 3.1.2. In the figures in this Appendix we illustrate these findings by assuming a constant marginal cost as represented by a horizontal marginal cost (MC) curve and a declining average cost curve (AC) approaching the marginal cost curve. This cost structure is consistent with evidence that charges per prescription decline with volume of prescriptions and that most of the decline comes with increases in volume from small to medium size pharmacies, with diminishing savings as pharmacy size expands. Average charge per prescription in 1990 was $38.83, $23.10, $21.45, and $20.86, ranging respectively from small- to large-volume independent pharmacies, (*Lilly Digest*, 1991).

Figure C.1 Medicaid Payment Rate Equals Marginal Cost

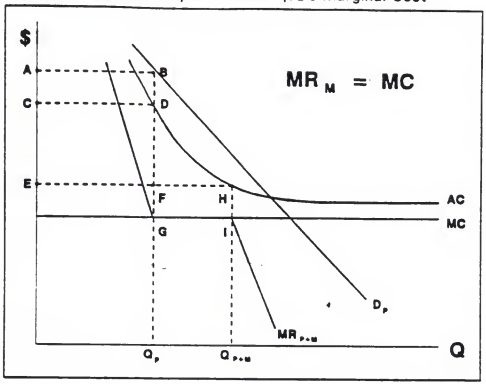
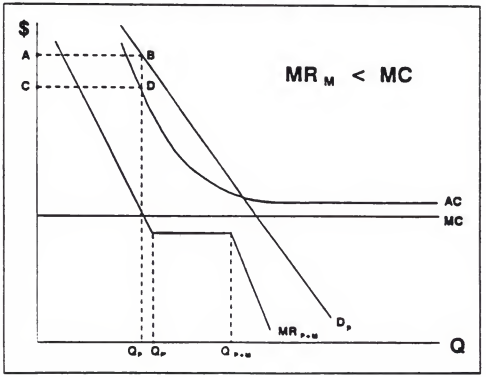


Figure C.2 Medicaid Payment Rate Less Than Marginal Cost



The structure of the pharmacy industry, with many small-scale providers, would seem to be inconsistent with this decreasing cost structure which usually characterizes a natural monopoly. There must, then, be some other constraint on their size. This constraint, again, may come from the limited demand in their local market area caused by the general unwillingness of customers to travel great distances for pharmacy services.

The demand of Medicaid recipients for pharmacy services is presumed to be insensitive to price (the Medicaid payment rate) but limited in quantity within a geographic market area. That is, Medicaid recipients generally do not have to pay for prescription drugs and hence pharmacies do not have to lower prices to attract additional customers as in the private market. However, Medicaid enrollees are sensitive to travel time (and costs) and hence, as for private patients, tend to seek services within their residential areas. Thus, the amount of Medicaid demand a typical pharmacy faces is determined more by its location than its pricing policy.

The quantity of Medicaid demand is represented by $Q_{p+m} - Q_p$ or the difference between the total services provided and the private demand. In both Figures C.1 and C.2, Medicaid marginal revenue is reflected by the flat portion of MR_{p+m}. This reflects the price setting ability of Medicaid. Medicaid generally sets flat rates for drugs dispensed to enrollees through their formula for ingredient costs and a flat dispensing fee; other payment policies set maximums for multiple-source drugs and mandate generic substitution. The addition of the flat marginal revenue curve for Medicaid (MR_m) to the private marginal revenue curve is shown in both graphs (MR_{p+m}). The difference between the two graphs is the relationship of Medicaid payment rates, or marginal revenue from Medicaid customers, to marginal cost.

In Figure C.1, Medicaid marginal revenue is assumed to just equal marginal cost ($MR_m = MC$). In this case, the total quantity provided is the sum of Medicaid demand and the profit-maximizing quantity of private demand (this quantity can be determined in the figure by the intersection of the MR_p and MC curves). This occurs at Q_p in Figure C.1, pharmacies will maximize profits by setting a private sector price (A) where $MR_p = MC$ and accepting all Medicaid customers where Medicaid marginal revenue exceeds marginal cost (limited to the Medicaid demand in the area). In Figure C.1, we see it can be profitable to participate in Medicaid even if the program pays as little as marginal cost. Profits are represented by the rectangle ABCD if the pharmacy does not participate in Medicaid and by ABEF minus FGHI if it does participate. The latter is greater due to the ability to produce at lower per-unit costs at the output level of Q_{p+m}. The declining average cost curve is likely to be important only for small pharmacies, since the data mentioned above suggests that larger pharmacies operate on the flatter portion of the AC curve. Nonetheless, all pharmacies will have an incentive to participate if

payment exceeds marginal cost. There may be greater incentives in areas where there is higher potential Medicaid demand, as this would move pharmacies further along on their average cost curves.

Medicaid's purchasing volume and the ability of the pharmacy to price discriminate on the basis of program eligibility makes it likely that Medicaid can pay close to marginal costs and still induce participation on the part of many pharmacies. If Medicaid payments fully cover average cost, so much the better, from the pharmacy's point of view, but the model predicts that the extra revenue would remain with the pharmacy rather than being passed along as savings to its private customers.

In Figure C.2 we show a different situation; in this case the Medicaid payment is below marginal costs. Even though the pharmacy is in an area with a similar quantity of Medicaid demand ($Q_{p+m} - Q_p$) this model predicts the pharmacy will not choose to participate in Medicaid since profits would be lowered by operating at Q_{p+m}. Instead, the pharmacy will provide Q_p prescriptions to private customers and realize a profit equal to the rectangle ABCD. Thus, while the model predicts Medicaid can pay as far below average costs as represented by marginal costs, it cannot go below this without jeopardizing participation and, hence, access. Given the earlier analysis of fixed and variable costs (Section 3.1.2), this would suggest that States cannot pay below 75 percent of average costs and expect adequate participation among pharmacies.

The situation is complicated somewhat if private customers also have some market power. HMOs, for example, may have the market power to negotiate discounts from pharmacies in exchange for guaranteed customer volume. If such health plans represent a significant share of the market, Medicaid's ability to pay below average costs may be affected, as it is the ability of the pharmacy to more than cover average costs (i.e. earn more than normal profit) from other payers that allows it to remain viable while receiving payments below average cost from Medicaid.

Among the important implications of this model are:

- Medicaid may be able to pay below average costs but it may be constrained, particularly in areas with competition from HMOs.
- Since marginal cost is about 75 percent of average cost at profitable output levels, Medicaid probably cannot set prices below 75 percent of average cost without impairing access, though this may imply a discount from retail prices of substantially more than 25 percent.
- Given the cost advantage of large and medium size pharmacies over small pharmacies, Medicaid participation of small pharmacies may be impaired at higher Medicaid rates than larger pharmacies.

- Effects of payment rates on Medicaid participation may take the form of a threshold effect; that is, there may be virtually no effect of Medicaid payment on participation so long as price is kept above marginal cost. But once the Medicaid rate drops below the marginal cost of participating pharmacies there may be significant nonparticipation.

APPENDIX D

Drugs Used to Examine Variability in Pharmacy Acquisition Costs Within Regions

DRUGS USED TO EXAMINE VARIABILITY IN PHARMACY ACQUISITION COSTS WITHIN REGIONS

Fifteen brand name drug products and five generic drug entities were selected. These 20 drugs represented one fourth of the original (80) drugs selected for the market basket. The generic drug entities were selected with the goal of having four or five manufacturers' drug products with enough units sold that there would be purchases in all (or nearly all) regions for each product. Reviewing aggregate sales volume reports for the generic products helped us select drug products and package sizes that would accomplish this goal. Secondarily, we sought to include "high cost" and "low cost" drug products, both within the generic drug entities and brand products selected. Consequently, drugs with fairly recent and longstanding patent expirations were included in the generic drug entity group and, to a lesser degree, high and low cost brand name drugs were included. Data on the price spread within each region for the following set of products was requested:

Amitriptyline 25 mg tabs	Top 5 generic firms
Augmentin 250 mg	
Buspar 10mg	
Ceclor 250mg cap	
Cephalexin HCl 250mg caps	Top 5 generic firms
Cipro 500mg	
Diabeta 5mg	
Ibuprofen 600mg tabs	Top 5 generic firms
Klonopin 0.5mg	
Lozol 2.5mg	
Mevacor 20mg	
Noroxin 400mg	
Phenobarbital 30mg tabs	Top 5 generic firms
Propranolol HCl 40mg tabs	Top 5 generic firms
Proventil Inhaler	
Prozac 20mg	
Seldane 60mg	
Vasotec 10mg	
Xanax 0.5mg	
Zantac 300mg	

APPENDIX E

Simulation of State Payment and Adequacy

SIMULATION OF STATE PAYMENT AND ADEQUACY

Basic Reimbursement Formula with Maximum Allowable Costs

The simulation relied primarily on the data from First Databank on wholesale prices and upper limits in deriving the basic estimates as follows:

Total State Payment = ((MIN (SPY1,SPY2) * Average Product Size)) + DISP

where:

SPY1 = the result of the State's ingredient cost formula (either AWP - % or WAC + %), as reported by National Pharmaceutical Council (NPC, 1992)
SPY2 = the Federal or State upper limit (MAC), whichever is applicable
DISP = the States' dispensing fee (NPC, 1992).[6]

The result of this calculation for each of the individual drug products in the expanded market basket (around 1,600) formed the basis of the simulation. Refinements were made to this basic payment amount to reflect policies that limit the number or size of prescriptions and mandate generic substitution. Average product sizes were used from a Tape-to-Tape State (or group of States) that more closely reflected each State's policy in this regard. States were grouped as follows: California (used California average); Michigan, Oregon, and Nebraska (used Michigan average); Arkansas, Oklahoma, South Carolina, Texas, and Wyoming (used Georgia, Michigan, and California average); Georgia (used Georgia); and all other States used the Georgia and Michigan average. California's policies were such that the average product sizes resulted in significantly higher amounts; hence they were used alone and left out of the average for the majority of States.

Incorporation of Limits on the Number and Size of Prescriptions

The initial plan was to use an average prescription size from all three Tape-to-Tape States combined, since this would even out small differences due to prescribing nuances across States. However, inspecting the results for each Tape-to-Tape State separately revealed considerable differences in prescription sizes for several drugs across States. Furthermore, it appeared that these

[6]The NPC reports State ranges in the dispensing fee and whether or not there is some other complication in how the State pays for dispensing fees (see notes to Medicaid Drug Reimbursement Report Table, NPC, 1992, p. 76). States with complications were flagged and their dispensing fee amount was simulated to take into account details where possible. If we could not simulate the formula, calls were made to the States to obtain a mean value to use in the simulation. The values reported in Table 3.4 for all States flagged are averages derived from the simulation for the specific drugs in the market basket.

differences reflected variations in the reimbursement policies of the three States (NPA, 1992). Therefore, we decided to adjust the prescription sizes used for the payment simulations to reflect what was likely to be the experience in each State relative to payment policies. Justification for this is discussed below.

California's reimbursement policy is unique among States and fosters large prescription sizes by limiting the number of refills (three) within a 75-day period and requiring a minimum dispensing quantity of 100 for maintenance drugs. Since we had data specific to California, we decided to use that specificity in our payment simulation. We also chose to use specific, State-level data for Michigan and Georgia individually. Two States, Oregon and Nebraska, with dispensing limit policies that were the same as Michigan's (100-day supply) were assigned the average prescription size that occurred for Michigan. An average prescription size calculated from all three Tape-to-Tape States' data was used for States with a reimbursement policy that encouraged larger size prescriptions, a limit of three prescriptions per month. This average size was used for five States: Arkansas, Oklahoma, South Carolina, Texas and Wyoming. For all other States and the District of Columbia, an average prescription size calculated from the Georgia and Michigan Tape-to-Tape data results were used. For these States, the averaging of the two States' data helped reduce variation related to medical practice differences in the States.

Finally, the overall State market basket payment was found by summing the total State payments for each prescription type, weighted by prescription volume.

Mandatory Generic Substitution

In those States that required substitution of generic drugs when available (NPC, 1992), a separate set of volume weights were used. These policies require the pharmacist to dispense generic multisource products when available. These policies change the mix of products dispensed within the Medicaid program and the payment simulation attempted to capture this. In States with this policy, it was necessary to increase the importance of generic products in the simulated payment. This was accomplished by 1) removing the brand-name product for each drug entity; and 2) redistributing the number of prescriptions for those products to the remaining generic products, based on the proportion of all generic product prescriptions for each generic manufacturer. To derive these alternative weights,

all brand name versions of drugs that were multi-source were omitted[8] from the Tape-to-Tape data on volume for the market basket of drugs. The weights were then recalculated.

Measurement of Adequacy of Payment

The measure of the adequacy of State payment is not meaningful for every drug at the individual drug level. Therefore, differences in State payment and costs are presented in an overall measure based on the total market basket. The overall adequacy of State payment measures was derived by taking the difference in the above weighted State payments and similarly weighted values for the State ingredient costs.

Adequacy of Payment for Ingredient Costs

Since there is a pattern in some States of paying generously for ingredient costs but not dispensing fees, the overall measure of adequacy is broken out into its two components for further analysis. Specifically, the adequacy of payment for the ingredient cost component is derived as follows:

$$\text{Ingredient Pay Differential}_i = \text{State Pay for Prescription Ingredient}_i - \text{Average Prescription Ingredient Cost}_i$$

where:

$$\text{State Pay for Prescription Ingredient}_i = ((\text{MIN (SPY1, SPY2)} * \text{Average Prescription Size}))_i$$

This difference reflects only the differential of payment for the ingredient cost of each drug and sheds light on the difference in the gross margins that are generated under State payment for the actual chemical purchased for dispensing. These differences are affected by both the cost and payment side. The costs are shaped by the purchasing arrangements of pharmacies in each region/State, which in turn, are affected by the chain of distribution available for pharmacies in each State, their volume of operation and group purchasing arrangements. The patterns in these costs were examined earlier in Table 3.1. In some of the following tables, the difference in these costs and State payments are examined for the entire set of drugs in the market basket, again, by weighting the prescription measures by the volume weights.

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[8] Codes from First Databank denoting multi-source (GI) and brand (GPI) were used to flag these drug products.

Adequacy of Payment for Dispensing Costs

We can also separately examine differences in the amounts paid by States for dispensing costs and the estimated costs incurred. This comparison shows whether States pay more/less adequately for the costs incurred in dispensing prescriptions—largely labor and overhead. Ideally, States would align payments for each component with the costs of that component. This would, in a competitive market environment, encourage efficiency in purchasing drug ingredients as well as dispensing.

Adjustment for Lags in Payment

An important aspect of payment that affects the willingness of pharmacies to participate and serve Medicaid enrollees is the speed with which they are reimbursed. The cost of maintaining unpaid accounts, especially for those pharmacies providing significant amounts of Medicaid services, can be substantial. Data gathered in each State by the National BioSystems survey provided some idea of the relative length of time each State took to pay pharmacy bills in 1990 and 1991. According to these data, the average length of time was as low as two days and as high as 66 days across the States. These variations may correlate with the number and type of pharmacies participating in the States. Whether delays have an impact on participation depends on the costs incurred with lags in payment and the pharmacy's volume of Medicaid prescriptions.

Although a direct measure of the costs a pharmacy faces due to lags in payment (e.g., financing of inventory, additional administrative and bookkeeping costs) would be desirable, these are not available in the data. Instead, the data on the extent of the delay in Medicaid payment are used to derive a measure that indirectly reflects the costs to pharmacies. One way to do this is to derive a "discount factor" to be used either independently, or to "discount" the average reimbursed amount in each State. This approach follows a well-established method that has been used for deriving present discounted values of income streams related to investment decisions, either public or private (Musgrave and Musgrave, 1980). In effect, it asks: what is the value today of receiving the payment at some future time, given the rate at which we discount the future and at which money is generally borrowed? Usually, a market rate of return or interest rate is used in deriving this discount factor:

$$PDV = \$ * 1/(1 + i)^t$$

where:

- PDV = present discounted value of the income received some time in the future;
- i = interest rate;
- t = time period of delay in payment; and
- $ = dollar amount reimbursed for Medicaid prescriptions.